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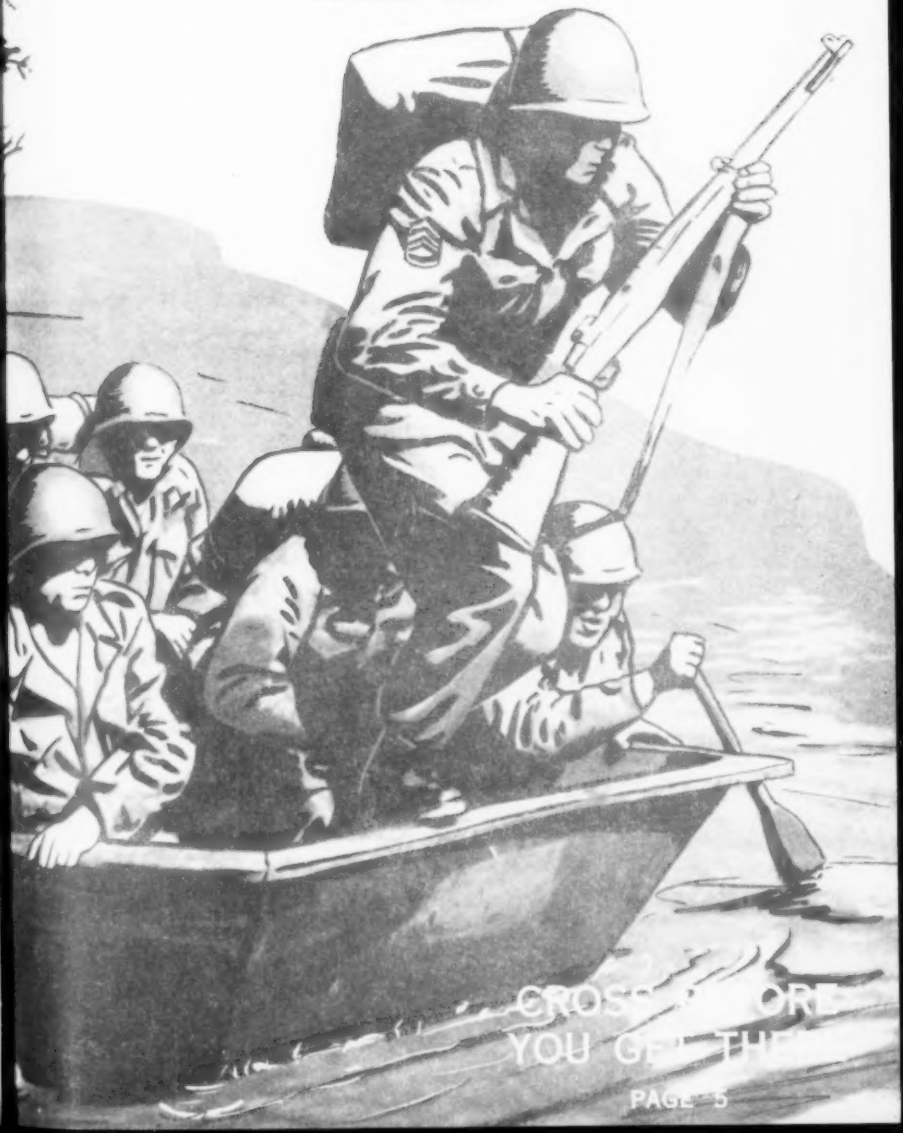

INFANTRY SCHOOL QUARTERLY

The latest thought on infantry

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Printed and bound by the personnel of the Army Field Printing Plant, Fort Benning, Georgia

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Published quarterly by The Infantry School, Fort Benning, Georgia. Entered as second-class matter June 11, 1948, at the Post Office, Columbus, Georgia, under the Act of March 3, 1879. Subscription rate, $2.50 a year for four copies. Address applications for subscriptions to The Book Department, The Infantry School, Fort Benning, Georgia.

Cross Before You Get There

By Maj Robert G. Kimball, Infantry

Company E, 8th Infantry was busy setting up its bivouac area. The kitchen crew was preparing supper—hot supper. Pup tents were springing up. The men were trenching around their respective homes. Captain Vet, CO of Company E, was standing outside the tent labeled "Command Post." Around a glowing fire, 50 yards from the CP, sat three of his platoon leaders. Captain Vet sauntered over and inquired if all the platoons were set for the night. The platoon leaders all answered, "Yes, sir," at the same time.

Lieutenant Mort, Weapons Platoon leader, invited the captain to sit down. He remarked, "You know, Captain, it's wonderful to be pulled back from the front lines, but I can't understand why we're to spend this week rehearsing for coming events. Why is the crossing of a river so different from taking any other objective? We never rehearsed for other operations."

"Well, Mort," said Captain Vet, taking a seat, "I'll try to explain the problems that face an assault rifle company in an attack against a river line.

"As you know, our division has to cross the Muddy River which is reported to be well defended. Our regiment has the mission of establishing a bridgehead. Planning for this operation must be thorough and it has to be carried out as early as possible before the actual crossing.

"You know the expression 'Don't cross your bridges until you come to them.' Well, it doesn't apply to a river crossing operation.

"Reconnaissance is essential to the formulation of a good plan and a good plan is vital to the success of the operation. So you see we do a lot of, let us say, anticipatory bridge crossing before we ever put a boat in the water or a bridge across it.

"Since the attack of a river line involves techniques new to us—techniques that are not characteristic of normal operations, rehearsals pay big dividends. You noticed the engineers also pulled back and are bivouacked near us. Well, they play a most important role in the crossing. They actually assist us in crossing.

"It may seem strange, but the average American soldier knows very little about paddling and handling assault boats. One of our jobs back here is to train the company in the correct technique of launching, loading, and paddling these boats.

"The engineers, technicians in handling this equipment, will conduct most of this training. They will also furnish much of the equipment for the operation. Since we are one of the assault companies most of us will cross in M2 assault boats." (See Figures 1, 2, and 3.)

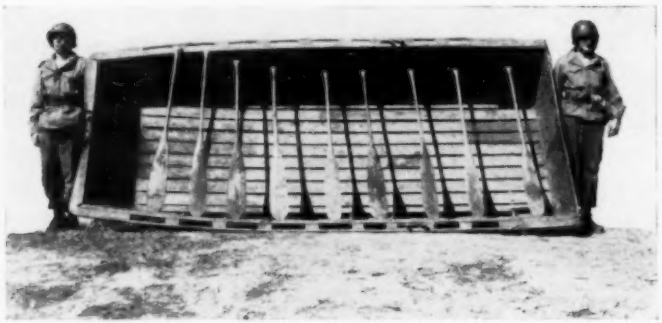

Figure 1. The M2 assault boat is a scow-type plywood boat weighing 410 pounds.

Lieutenant Mort broke in, "I've never had a chance to work with this equipment. Would you explain generally what we can expect?"

Captain Vet knocked his pipe out against his boot heel and glanced toward the kitchen. "Yes, Mort, but first let's have some hot chow." He watched the chow line forming.

Figure 2. Each M2 assault boat carries 12 fully equipped riflemen and a crew of 3 engineers. The boat can be carried by its riflemen-passengers in the manner shown.

Figure 3. As the boat team nears the water's edge, the boat is righted and carried directly into the water.

After supper, the bivouac area began to quiet down. The men were tired. They had been on the front lines for the past month and then had taken the long trip back to this area to start training for the crossing of Muddy River.

Captain Vet and his platoon leader were seated near the glowing embers of the fire once more.

"Well, Mort," the Captain said, "here's the deal on the engineer equipment for a river crossing operation.

CAPACITY OF ENGINEER ASSAULT BOATS M2

A method of loading engineer assault boats M2 for a river crossing may be determined from the following data. The capacity loads listed below are exclusive of a crew of three engineer soldiers, who assist in paddling the loaded boat, and who remain with the boat to take it back across stream for additional loads.

a. One rifle squad (nine men) with individual weapons and combat equipment. These boats will also hold three additional men with normal equipment.

b. One weapons squad (nine men) with one light machine gun and ten boxes of ammunition and a rocket launcher with six rounds of ammunition.

c. One 60-mm mortar squad (five men) with one mortar, and a light machine gun team with weapon and ammunition. 36 rounds of 60-mm mortar ammunition.

d. One 57-mm rifle squad (five men) with one 57-mm rifle; and a rocket launcher team with weapon and ammunition. 24 rounds of 57-mm ammunition.

e. One machine gun squad (seven men)*, and one heavy machine gun and thirteen boxes of ammunition.

f. One 75-mm rifle section (nine men)* with two 75-mm rifles and twelve rounds of ammunition.

g. Maximum load for any one M2 assault boat not to exceed 4,000 pounds.

*Less driver, truck, light.

Figure 4. This table shows some of the typical boat loads the M2 assault boat can handle.

"There will be several types of boats available for the operation. Among these are two-man and five-man canvas reconnaissance boats. These boats are pneumatic. They have a series of compartments, each having a plastic bladder inflated by mouth. They are propelled by paddling. Very good for any patrols we may have to send across the river.

"Most of us will cross in M2 assault boats. You saw them stacked by the road as we came into this area. They are scow-type plywood boats weighing about 410 pounds each. These are the boats with which we will train. Each one carries 12 fully equipped riflemen in addition to its normal crew of three engineers. There are many tactical methods of loading these boats as long as the maximum load does not exceed 4,000 pounds." (See Figure 4.)

"Our men will paddle these M2s while the engineers do the steering. Since there is a definite method of paddling, we teach our men how to load and paddle by having them do it first on dry land. (See Figure 5.)

Figure 5. Assault boat passengers do their own paddling. Since few soldiers are accomplished boatmen, paddling techniques are taught on dry land during rehearsals prior to the river-crossing operation.

"The depth of the water determines the loading method we'll use. If the water is shallow the boat is launched bow first and the riflemen wade out along the sides and

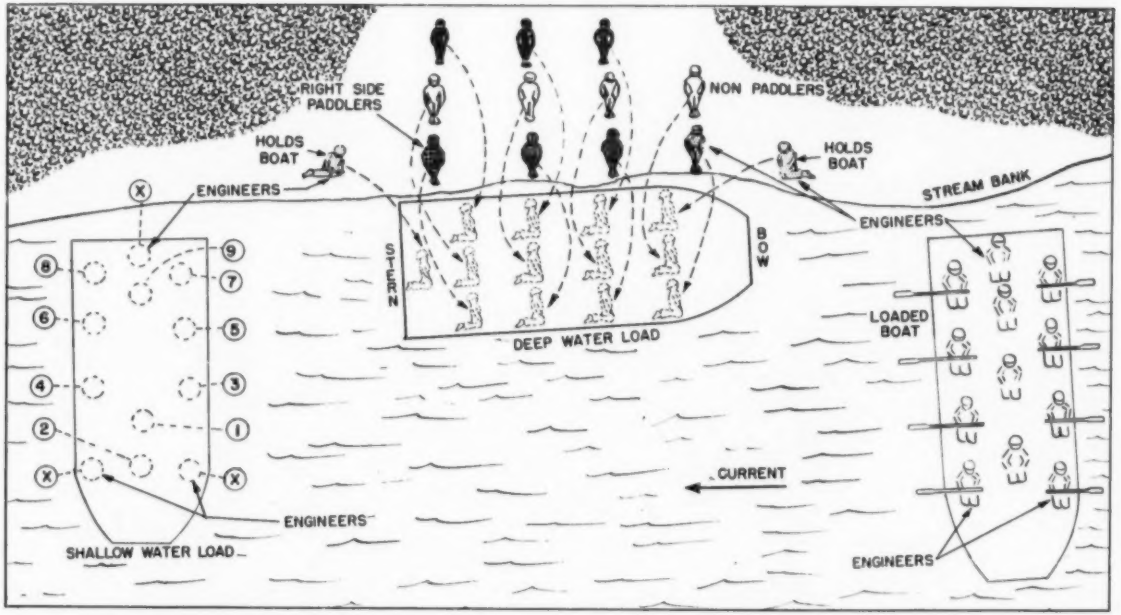

Figure 6. The method of loading in deep and shallow water differs. In shallow water loading, passengers wade into the water and load from either side of the boat. When the water is too deep for this method, the boat is pulled alongside the bank (bow upstream) and passengers load directly from the bank into the boat.

load into it. But if the water is deep, we load into the boat as it is pulled alongside the bank." (See Figure 6.)

"You know, Captain," Lieutenant Mort said, "I'm beginning to see why a rehearsal and training are so important. How about motor boats, do we ever use those?"

"Yes," said Vet, "when we are crossing a very wide river and when we sacrifice secrecy for speed. We use a storm boat, which can carry seven combat equipped infantrymen and a two-man engineer crew. It is powered

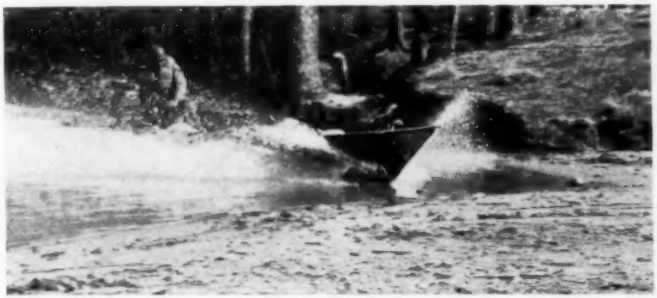

Figure 7. When the emphasis is on speed, the Infantry may use a storm boat powered by a 50 to 55 horsepower engine. Here, such a boat is shown in a spectacular crash-landing.

Figure 8. The same boat as shown in Figure 6, a moment after driving ashore. These boats carry 7 riflemen and a 2-man engineer crew.

by a 50 or 55 horsepower outboard motor. It is also made of plywood and weighs about 450 pounds." (See Figures 7 and 8.)

"I can see that we have the stuff to get our men and their weapons across," Mort said, "but how about the vehicles and heavy stuff that we need?"

"Oh, there are many means of getting them across. Rafts or bridges can be constructed to take care of heavy equipment. In the early stages of the crossing they are usually ferried across on the infantry support raft. Assault boats are joined stern to stern and plywood treadways are clamped to them. A three-pontoon raft can carry a 2½-ton truck (see Figure 9) and a five-pontoon raft can carry the same truck towing a 105-mm howitzer."

Figure 9. An infantry support raft formed by joining M2 assault boats end-to-end in pairs and laying a tread across three pairs. This 3-pontoon raft carries a 2½-ton truck, drivers, and an engineer crew. A 5-pontoon raft will carry a 105-mm howitzer in addition to the truck and personnel.

"In the later stages of the operation, bridges are constructed. Footbridges are used by reserve and supporting units, (see Figures 10 and 11) and then larger bridges are constructed for vehicles and heavy equipment.

"Now that you have a general idea of the engineer equipment available to us, you'd better understand some of the principles that apply to a rifle company in the attack of a river line.

Figure 10. Footbridges are constructed after the assault waves have crossed. A trained combat engineer platoon can build such a bridge as the one shown here in a matter of minutes.

Figure 11. Once the footbridge is in, personnel cross rapidly on foot.

"A river crossing can be a hazardous operation if the principles of planning and the execution of the plan are not fully understood.

"First, we'd better determine what a river line is. What do you think a river line is?"

Lt Mort, beaming, answered, "Sir, it is the water's edge on the far side of the river—the defender's side, isn't it?"

"That's correct," agreed Vet, "and that is the line we must penetrate if we are to establish a bridgehead on the far side of the river. It's a very important military consideration since it is a natural obstacle for an attacker and a natural line of defense for the defender.

"As officers of a rifle company you may find yourself participating in any one of the four following types of crossing. First, *crossing a river not held by the enemy.* The idea is to get across before the enemy can get a chance to occupy the river line. Speed is the answer here.

"Second, *crossing when a river line is held but not organized by the enemy.* Again speed is essential to gain a foothold before the enemy does organize his positions.

"Third, *a crossing to reinforce elements already across.* This is very easy since a bridgehead will usually have been established.

"Finally, we have the type we are now faced with—*crossing against a well defended line.* Detailed planning is the key to success in this type of crossing."

Mort, shifting to a more comfortable position, remarked, "You know, Captain, it seems to me that much of the planning and many decisions must have been made *for* a company commander before he gets down to his planning."

"That's right," answered Vet, "but it's well to know what is usually planned for a rifle company and how these plans are arrived at.

"You'll probably be told where you will cross, what attack positions you'll occupy, what fire support you'll be given, and how many assault boats you'll have for the crossing. In some cases you may even be told how you'll load these boats. But again it's important to understand the principles and special considerations used by higher headquarters in arriving at these plans.

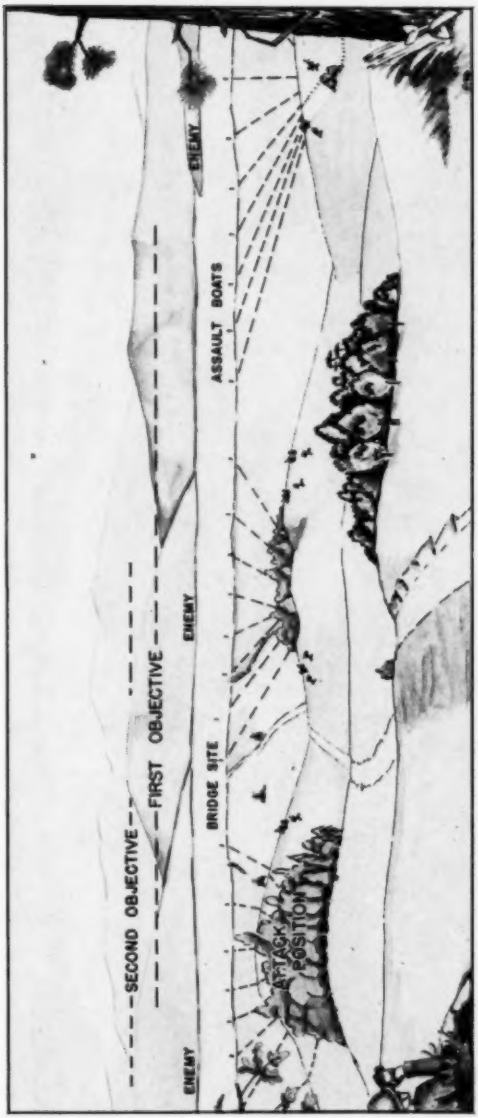

Figure 12. A good crossing site provides suitable attack positions on the near side of the river and appropriate objectives on the far side.

"Take reconnaissance first. There are two types necessary when planning an attack of a river line: tactical reconnaissance and technical reconnaissance.

"The *technical reconnaissance* is made by engineers to determine the crossing site at which they can best support the operation.

"The *tactical reconnaissance* is made by all infantry leaders responsible for establishing the bridgehead. The two types of reconnaissance may be made together (usually at regimental level and higher), or separately. However, it is important that, when made separately, the leaders participating in one type be familiar with factors being considered by leaders of the other type.

"After the reconnaissance is completed reports and recommendations are made to the commander responsible for establishing the bridgehead. This commander makes the final decision as to where the crossing site will be." (See Figure 12.)

"As rifle companies will usually cross at the site selected by higher headquarters, their reconnaissance is usually conducted after this site is selected. A rifle company may be ordered to send patrols across to determine enemy locations and strength. They may use some of those pneumatic boats I mentioned earlier." (See Figures 13 and 14.)

Figure 13. A two-man pneumatic reconnaissance boat.

"Several factors enter into the selection of a crossing site. Good road nets on our side and the enemy's side of the river are always very important, since our organic vehicles must operate on both sides of the river. Also, we need good banks on both sides of the river. This is important to the engineers who construct the bridges. If approaches have to be prepared they'll lose a lot of time.

"The speed of the current has to be considered. The commander must decide whether to cross at the narrowest spot and contend with the swift current, resulting in difficulty in building bridges, or whether he'll cross at a wider part where the speed of the current is less.

Figure 14. A five-man pneumatic reconnaissance boat.

"Tactically, a first consideration for a crossing site is that it has good attack positions that have good approaches to them, as well as to the water's edge, while affording cover and concealment. These attack positions can't be too near the river, since noises may cause loss of surprise. Again they can't be too far away as the 400-pound assault boats must be hand-carried to the water's edge. (These boats should be carried into the attack positions by vehicle.)

"In addition to having good attack positions the crossing site must offer suitable objectives on the far side. These

objectives should be terrain features that when captured will enable the unit to accomplish its mission of establishing a bridgehead." (See Figure 12.)

"*The first objective* should be a terrain feature that when captured will limit effective direct fire on the crossing front.

"*The second objective* should be a terrain feature that when captured will limit effective enemy ground observed fire on the crossing front.

"*The third objective* should be a terrain feature that when captured will eliminate effective sustained fire of ground weapons on the crossing site. In addition it should also eliminate this enemy fire from an area large enough to allow maneuver room for the unit involved in the crossing.

"Position areas for supporting weapons must be considered when selecting a crossing site. During the early stages of crossing, assault elements are very vulnerable and need all the supporting fires they can get.

"So, you see," continued Captain Vet, "extreme care must be taken in arriving at the final decision of where the crossing site will be located."

"Yes, sir," Mort said, "I can see the problems that face the commanders. But what if all the attack positions aren't the same distance from the river? How do we know when to move forward? You know you said we had to hand-carry the assault boats."

"A good question," Vet observed. "That brings up the subject of timing. It's very important in a crossing operation. The time distance from attack position to the river must be determined for all attack positions. All boats must reach the water's edge at the same time. These time distances are determined by the engineers. This is done for each boat team. It helps in getting all boats to the water's edge at the same time.

"Another time factor considered is the time the attack will be made, whether it will be in daylight or darkness. Choice of times is governed by the strength of the enemy and whether surprise and secrecy are to be maintained. Intelligence reports assist in choosing the time of attack.

Surprise is gained by a number of ways. Secrecy during your reconnaissance, minimum patrols operating—having a unit feint a crossing in a different location and of course crossing when and where the enemy least expects it.

"Another thing—we consider the time our supporting weapons will go into position to support us. Their movement into position is usually made under the concealment of darkness in order to maintain secrecy."

"Excuse me, Captain," interrupted Mort. "Everything you've talked about concerns the engineers, the supporting weapons, and other units and agencies. How about some of the principles that will be followed by a rifle company. You know I'm more than a little concerned about this crossing that we're going to participate in."

"OK, Mort, but it's quite late now," answered Captain Vet. "Let's hit the sack and tomorrow morning I'll give you a situation and problem and let you work it out."

"OK," agreed Mort. "Good night, sir."

The officers moved toward their tents and soon there was no sound but that of the guards making their rounds.

Lieutenant Mort lay awake a long time thinking of the coming operation, his first river crossing.

In the morning Mort approached the captain immediately after breakfast to remind him of his promise to continue his assistance on river crossing principles and techniques.

"Good morning, Mort," Captain Vet greeted him, "I trust you rested well."

"No, sir, I didn't, Captain," answered Mort. "As a matter of fact I lay awake and wondered how we were going to get across Muddy River—you know — the formation we'll use, what I'll do with my weapons platoon, how much support we'll have and—a million other things."

"Hold it, Lieutenant," said Vet. "One thing at a time and we'll clear up all your problems. I think by presenting a situation and requirements and having you work them out you'll pick up most of what you need to know. It so happens that I have a map of Muddy River showing where we'll cross. Here is the map and you'll be Captain Company E. I'll give you enough information and parts of an attack

order so you can understand the situation. This is the sort of thing you'd get from a battalion commander's order. Better make notes."

(Note to Reader: To get the most from this article, from this point on you, also, should assume the role of Captain Company E and work each requirement. Check your solution with Captain Vet's solutions and discussions at the end of this article.)

The Captain checked a set of notes, then began. "The enemy holds the north bank of Muddy River in the vicinity of Greenwood Hill. Our patrols have crossed and observed many small outposts in that area and air reconnaissance indicates strong enemy positions throughout the area. The 8th Infantry Regiment, 4th US Division crosses the Muddy River at 0700 hours tomorrow to establish the northeastern sector of a division bridgehead. The 12th Regiment is on our right. CO, 8th Regiment, plans to employ the 1st and 2d Battalions in the assault, 1st on the right, and 3d Battalion in reserve. For 2d Battalion objectives and zone of action see Map A, (Figure 15).

"Now, as battalion commander of the 2d Battalion here are parts of my attack order," continued Captain Vet.

"The near bank of Muddy River in the 8th Infantry zone of action is now held by 3d Battalion, 22d Infantry. They will support us by fire.

"One class 50 raft and one class 8 (infantry support) raft will operate in support of the regiment.*

"One footbridge will be constructed in zone of 1st Battalion."

"Division class 50 bridge will be constructed down stream from us—(not shown on map).**

"Thirty-six assault boats, M2, will be allotted to 2d Battalion.

"29th Field Artillery Battalion (105-mm howitzer) in direct support of 8th Infantry for crossing. 20th Field

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*Rafts are classified according to tonnages they can carry. A class 50 raft carries a 50 ton load, a class 8, eight tons.

**Bridges, like rafts, are classified according to tonnages they will support. A class 50 bridge supports a 50 ton load.

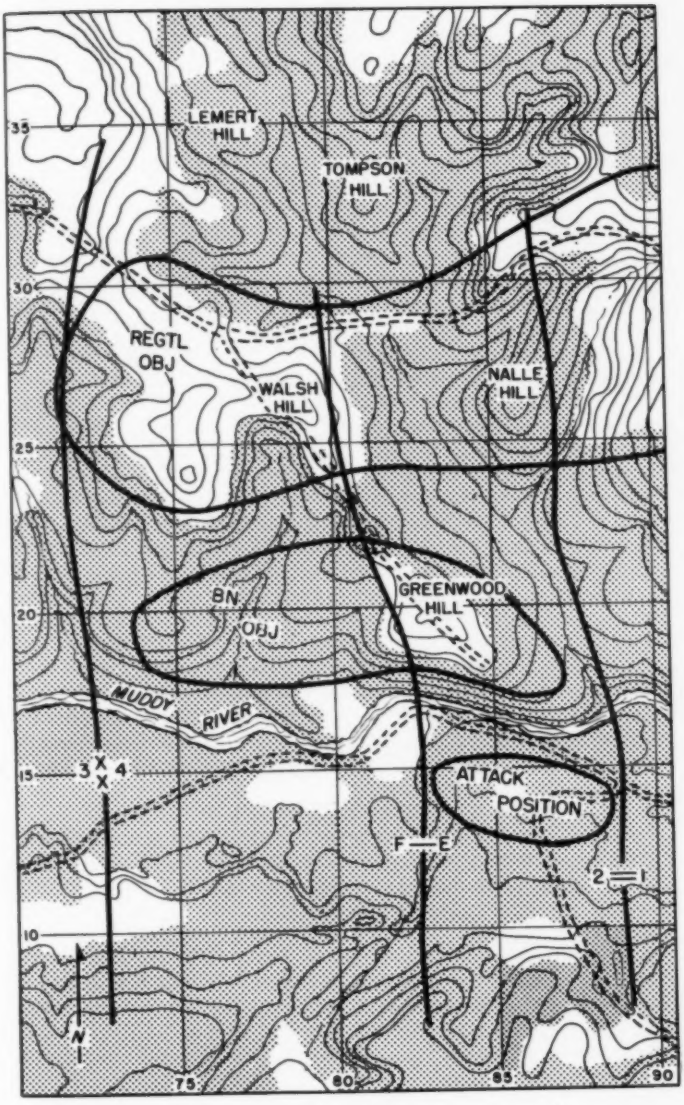

Figure 15. Map A.

Artillery Battalion (155-mm howitzer) in general support of division.

"Heavy Mortar Company, 8th Infantry, in general support. Priority of fires of the 1st Platoon to 2d Battalion.

"Regimental Tank Company to support crossing by fire from positions on near side of river.

"Regimental crossing zone to be smoked commencing at H minus 15.

"2d Battalion attacks at 0700 hours tomorrow with E and F companies abreast, Company E on the right, to seize Greenwood Hill and continues attack to seize regimental objective in zone.

"Company E: Attack to seize Greenwood Hill in zone and continue attack to seize regimental objective in zone. For attack position, crossing front, and objectives, see Map A.

"Company F: ********

"Company G: ********

"Company H:

"Machine Gun Platoon; one section attached to Company E. Platoon (-) attached to Company F.

"75-mm Platoon; one section attached to Company F. Platoon (-) attached to Company E.

"81-mm Mortar Platoon in general support from positions in vicinity of 853103. Mortar Platoon to displace on my order. One forward observer party with Company E and one with Company F.

"Pioneer and Ammunition Platoon: 1st Squad attached to Company H. Platoon (-) to establish and operate an advance ammunition supply point on far side of river."

"Allotment of assault boats: Company E, 18; Company F, 18.

"Elements of battalion to cross in assault boats as follows —1st and 2d waves: Companies E and F and attachments. 3d wave (to cross in assault boats used by Companies E and F): Company H (less attachments to Companies E and F), forward echelon of Battalion Command Post, forward elements of Medical Platoon, and elements of Battalion Communication Platoon.

"Company G, Medical Platoon (-), Battalion Headquarters (-) and Battalion Headquarters Company (-) to cross on my order by means to be designated.

"Priority for vehicles crossing on infantry support raft:

One weapon carrier and trailer from each platoon of Company H.

One weapon carrier and trailer from each rifle company.

Two trucks from Battalion Medical Platoon.

One command and one communication vehicle from Battalion Headquarters.

"Daylight at 0630 hours; darkness at 1900 hours.

"Are there any questions?"

"Yes, sir," piped up Mort, "I have plenty of them. My first one is about the Regimental Tank Company. It is normally employed by attaching the platoons to the battalions. Why isn't it employed that way now?"

"Well," answered Captain Vet, "The tanks can't be crossed until the heavy raft starts operating in the zone, so the tank platoon supports us by fire until it can cross, after which it is attached to the battalions as in any other normal attack. Sometimes we have to wait for construction of the heavy bridge over which the tanks do have a high priority in crossing."

"Gee, I hadn't thought about that," said Mort. "That takes care of that question. Now, is it normal to attach the sections of machine guns and 75-mm rifles to assault rifle companies."

"Yes, Mort, it is," answered the Captain, "because these weapons normally do not take up firing positions on the near side of the river, but move across with the assault companies to give the required close support."

"But how about the boats to cross them, Captain?" inquired Mort.

"That will be solved later by you. Are there any more questions about the order," asked Vet?

"Yes, sir, I have one more. Do you always get a priority list for vehicles crossing?"

"Absolutely," answered Captain Vet, "ammunition vehicles first, medical vehicles second, communication vehicles

third, and, finally, reconnaissance vehicles. This priority must be established since the capacity of our rafts and bridges is limited and we must get supply and evacuation vehicles across as soon as possible."

"I think that about clears up everything in the order. Now I'm ready for your questions concerning the company," said Lieutenant Mort as he spread his map out on the ground and began to study it.

Captain Vet scribbled out the requirements on a note pad and passed them to Lieutenant Mort. They were:

a. Formation of the company for the crossing.

b. Crossing fronts assigned to each rifle platoon.

c. Assignment of objective and responsibilities to platoons to include provisions for a support platoon after crossing.

d. Employment of the weapons platoon to support the rifle platoons.

e. Elements of the company to cross in:

(1) First wave.

(2) Second wave.

f. Allotment of assault boats to the elements of the company.

g. Location of attack positions for platoons and attachments.

Lieutenant Mort read the requirements and scratched his head.

"Well here goes, sir," he said after a brief meditation.

Mort prepared a set of solutions to these requirements. Some of his answers were correct, some of them a little off the beam. The following are solutions and discussions which Captain Vet prepared for Mort to check his answers against. Use these solutions to check your own answers to the requirements.

a. *Formation of the company for crossing:* Three rifle platoons abreast, 1st on the right, 2d on the left, 3d in the center.

Discussion: A rifle company usually crosses with three platoons abreast in order to gain the maximum shock action on the first objective. Since a river is a natural

obstacle, maneuver by a support unit, withheld to influence the action, is practically impossible.

b. Crossing fronts assigned to each rifle platoon: The normal frontage as assigned in any other attack (125-250 yards).

Discussion: In assigning a platoon zone of action the company commander considers: the amount and type of enemy resistance expected during the crossing, the condition of the banks on both sides of the river, the width and depth of the river, the speed and direction of the current, and the amount and type of crossing equipment available. All of these factors may require that gaps exist between zones of action of platoons; however, in order to maintain tactical unity of the platoon, large gaps should not exist between boat teams within the platoon. For protection during the crossing and ease of deployment after the landing, lateral intervals between boat teams resemble those between corresponding units on land.

c. *Assignment of objectives and responsibilities to platoons to include provisions for a support platoon after crossing:* 1st Platoon, after capture of 1st objective (Greenwood Hill), reorganize and continue the attack to seize Nalle Hill in zone on order.

2d Platoon, after capture of 1st objective (Greenwood Hill), reorganize and continue the attack to seize Walsh Hill in zone on order.

3d Platoon, after capture of 1st objective (Greenwood Hill), reorganize on objective and remain on Greenwood Hill as support platoon. Displace on order.

Discussion: The mission of all three assault platoons is to clear the river bank promptly. By seizing the first objective, effective enemy direct fire will be eliminated on the crossing site. If the actual crossing of the water is opposed, or if the initial company objective is close to the river, no attempt is made initially to reorganize from boat teams to platoon groups. The platoon leader regains control of the boat teams and reorganizes his platoon as soon as he can. When the actual crossing of the water is unopposed,

individual boat teams go immediately to previously selected locations and form their normal platoon organization. Rifle platoons then advance to the initial objective. Subsequent operations follow the principles that apply for any other attack.

d. *Employment of the weapons platoon to support the rifle platoons:* 57-mm Rifle Section; one squad attached to 1st Platoon; one squad attached to 2d Platoon; Section (-) attached to 3d Platoon.

60-mm Mortar Section: Crosses in second wave as a section and, immediately after crossing, one squad attached to 1st Platoon; one squad attached to 2d Platoon; Section (-) attached to 3d Platoon.

Discussion: The weapons platoon of an assault rifle company is not used to support the actual crossing. It crosses with the assault company and supports the attack after landing on the far side. The 57-mm rifle squads are attached to the assault platoons to reinforce them during the critical stage of the attack—when they hit the far bank. The 60-mm mortar section does not occupy firing positions on the near bank since the time between the first and second waves is normally too short to warrant this. The 60-mm mortar section crosses under company control and is then employed as in normal operations—one squad attached to, or in direct support of, each assault platoon or, if observation permits, the section in general support of the company.

e. *Elements of the company to cross in:*

(1) *First wave:* Rifle platoons with 57-mm rifle squad attached and company aid man.

(2) *Second wave:* Company Headquarters, 60-mm Mortar Section and Weapons Platoon Headquarters, section of machine guns and section of 75-mm rifles (attached to company), and artillery and mortar forward observer parties. (See Figure 16.)

Discussion: When a rifle company is in the assault echelon, enough assault or storm boats or other crossing craft are provided to move the entire company in one trip. The first, or leading wave, includes the reinforced assault platoons so they may clear the near bank and take

the 1st objective. The second wave follows as closely as necessary to maintain control of the assault elements. The company command group and attached weapons will not be able to function as efficiently if they cross with the leading wave. Control could be lost easily by the company commander and the attached weapons would be unable to find space for position areas if assault platoons, command group, and attached weapons crossed in a single wave. The second wave has no prescribed time in which to cross. It crosses soon enough to maintain control of the company, and when enough of the bank has been cleared to provide room for position areas for the 60-mm mortar section and weapons attached from the heavy weapons company.

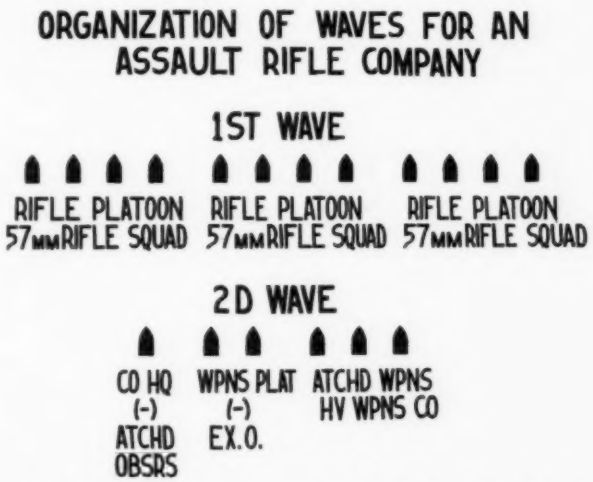
ORGANIZATION OF WAVES FOR AN ASSAULT RIFLE COMPANY
1ST WAVE
RIFLE PLATOON 57MM RIFLE SQUAD
RIFLE PLATOON 57MM RIFLE SQUAD
RIFLE PLATOON 57MM RIFLE SQUAD
2D WAVE
CO HQ (-) ATCHD OBSRS
WPNS PLAT (-) EX.O.
ATCHD WPNS HV WPNS CO

Figure 16. An assault rifle company may be broken down into waves for the river crossing, as shown here.

f. *Allotment of assault boats to the elements of the company:*

Each rifle platoon with attachments	4
Attached weapons from heavy weapons company	3
Company command group	1
Weapons platoon (-)	2

TYPICAL LOADING OF RIFLE COMPANY REINFORCED IN ASSAULT BOATS M2

Unit	T/O Strength O	WO	EM	Members Not Crossing with Units	Non-Members Crossing with Units	Total Men Crossing
Each Rifle Platoon	1		40	1 Messenger	5 (57-mm Rifle squad) 1 Co Aid Man	46
Weapons Platoon Rifle Company	1		39	15 (3-57-mm Rifle Squad) 1 Messenger 2 Truck Drivers	1 Co Aid Man	23
Co Hq Rifle Co (less filler personnel)	2	1	26	20 (W.O., Mess personnel, Armorers, Clerk, Orderly)	4 Pl Msgrs 1 FA Fwd Obsr 1 FA Rad Man 1 Hv Mortar Obsr 1 Hv Mortar Rad Man 1 81-mm Mortar FO 1 81-mm Mortar Rad Opr	19
MG Section	0		17	2 Truck Drivers		15
75-mm Rifle Section	0		10	1 Truck Driver	8 (P&A Sqd)	17

Figure 17. A loading table, such as shown here, is a necessary part of pre-river-crossing planning.

Discussion: The company is allotted 18 boats (assault M2) loading capacity not to exceed 4,000 pounds per boat. There is no prescribed loading plan for the crossing of a company. However, tactical unity is maintained as far as possible in assigning men to crossing craft. A list of personnel to be crossed, to include non-members of the com-

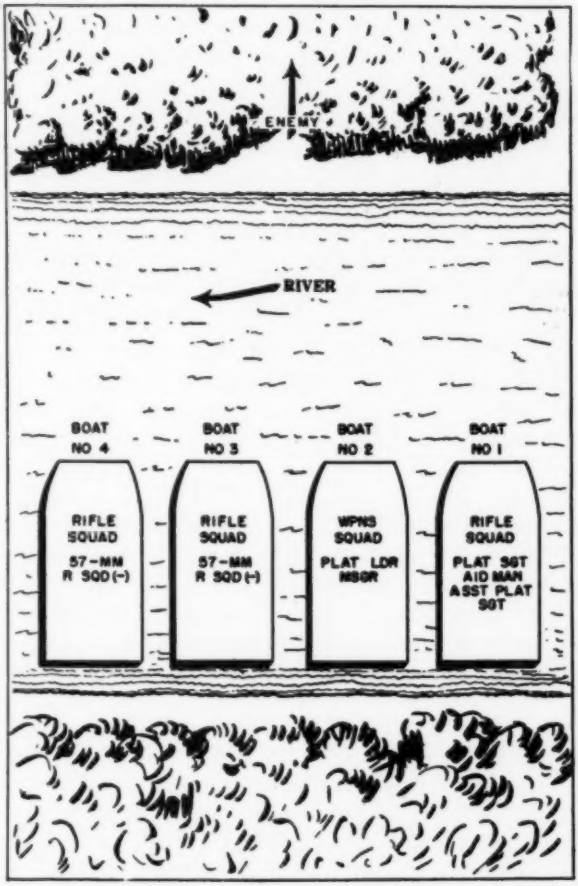

Figure 18. A typical boat grouping, showing assignment of assault boats to a rifle platoon reinforced with a 57-mm rifle squad.

pany, and also members who do not cross initially should be drawn up as a loading and planning guide. (See Figure 17.) In addition a typical boat grouping is shown to include assignment of assault boats to a rifle platoon reinforced with a 57-mm rifle squad (see Figure 18).

g. *Location of attack positions for platoons and attachments:* Portions of company attack position assigned platoons from right to left in order 1st, 2d, and 3d Platoons. The rear portion of the company attack position assigned to Company Headquarters, Weapons Platoon (-) and attached weapons.

Discussion: The platoons should be placed in attack positions to conform to the plan of action. It is in this position that last minute coordination is carried out. Movement, by boat groups, into the attack position is planned so that minimum confusion exists. The boats are waiting and are hand-carried to the water's edge (see Figures 1 and 2).

Captain Vet helped Lieutenant Mort check his answers. When they had finished, Vet slapped his platoon leader on the back. "Mort," he said, "if you're never farther off the track than you've been in these solutions you'll always have a place in my company.

"Now there are a few other things to remember. Get them firmly in mind and you'll be set for the Muddy. Think about the conduct of the attack. That is the actual crossing of the stream. Engineers usually are in charge of the crossing craft; however, keeping direction from the embarkation to landing areas is the responsibility of the senior infantryman in each boat. The boat team (infantrymen) does the paddling. Each craft starts across the river as soon as loaded and goes as rapidly as possible to the opposite bank. No attempt is made to maintain formation while on the water, although intervals between craft should be maintained. No effort is made to counteract the natural drift (current) unless the current is so swift that it causes an appreciable drift downstream from the proposed landing site. In such a case, the need for counteracting this drift

is anticipated by the commander conferring with the supporting engineers.

"Firing from craft is rarely attempted in daylight and never at night. Upon reaching the far bank, the troops debark rapidly, deploy, and attack the initial company objective. Engineer crews return the craft immediately for further crossings."

Lieutenant Mort looked at Captain Vet. "You know Captain," he said, "I wasn't so sure of myself but now I feel a lot better. Thank you, sir. Guess I'd better get with my platoon for the rehearsals."

"Just a minute, Mort," Vet stopped him, "remember your orders must be issued in the assembly area and must be detailed. Each man must know what, when, where, and how to do everything you expect him to do. Rehearsals and prior planning will pay big dividends when the actual crossing takes place. Now move out with your unit and stress the importance of these rehearsals."

"Yes, sir," Mort said, as he dashed off to where his platoon was practicing paddling boats on dry land.

Recoilless Weapons—Combat Report, **by Capt Robert H. Philips, will appear in the next issue of the *Quarterly*. It details the successes and methods of employing our recoilless rifles in actual combat.**

Communication on Extended Frontages

By Capt R. E. Womer, Infantry

NOTE: The ideas presented in this article are those of the author and do not necessarily represent the views of The Infantry School. However, The School is aware of such difficulties as Capt Womer has encountered and is doing something about them. Corrective measures even now are being reflected in new T/O&E and field manuals.

"Communication equipment must fit the tactical situation. The tactical situation can never be made to fit the equipment." Remembering these words, which I first heard at The Infantry School in 1947, I am submitting a report on communication within my regiment, the 26th Infantry, 1st Division, now stationed in Germany. Here, if ever, is a case where equipment has had to be fitted to the situation.

Having been an instructor in the Communication Department at The Infantry School, I recall that most of our instruction was pointed toward the establishment of communication in a normal situation. Conversely, almost no time was devoted to communication in exceptionally *abnormal* situations. Having served as communication officer of the 26th Infantry for more than a year, I am convinced that we should emphasize the *abnormal* and *exceptional* to a much greater degree. At no time during my present tour of duty has the 26th Infantry, in its training maneuvers, engaged in a so-called normal situation.

At Benning we learned the normal frontage of an infantry regiment varies from as little as 1,000 yards for attack up to 4,800 yards for defense. The normal frontage of the 26th Infantry and other regiments of this division averages 14 to 16 *miles*. Obviously, frontages of 4800 *yards* and 16 *miles* cannot be considered similar situations. FM 7-20 indicates that an infantry battalion occupies a front ranging from 500 yards in the attack to 2,400 yards in defense. Our battalions are usually scattered across 7 to 10 miles of terrain. Our companies are assigned 4 to 5

mile fronts. To the 26th Infantry, this has become a normal situation.

Extended frontages and all the attendant evils put the pressure on control. It's hard to obtain, but as in all situations, control must be absolute; there can be no excuse for the lack of it.

Too often we hear something like this: "We are operating along a three-mile front and this SCR-536 radio was designed for only *one* mile. How can I be expected to communicate with that platoon?"

Such excuses will continue to be heard until experience or training teaches the alibier the answer to this particular communication problem.

It cannot be too strongly emphasized that if the equipment on hand is not suitable in range, military characteristics, and design, other equipment that is suitable must be obtained.

One of the principal duties of a communication officer or noncommissioned officer is, "To advise the commander on matters pertaining to signal communication." These people must realize that it is absolutely necessary that the commander know what he needs in time to do something about it. No commander can operate with equipment that *should* have been obtained but wasn't. No commander or communication advisor, when questioned as to lack of communication in his unit, should reply, "We are operating on extended frontages, and these radios haven't the necessary range."

This problem is not one for the communication personnel alone. As in all things, the commander is responsible. Each commander *must* realize the importance of his own individual communication system. Each commander must know the part that he plays as a link in a larger signal system. He must realize that without communication his unit may well be unsuccessful in accomplishing its mission. He must learn not to consider the T/O&E as the only solution to his communication problems, but rather he must know that frequently the T/O&E will not supply him with the equipment that he needs.

There is too much T/O&E consciousness. The commander who tries to operate with T/O&E equipment alone, is going to find himself neckdeep in loss-of-control quicksand. For just one of many instances, an Infantry regiment is authorized no spare SCR-608 radios. All SCR-608's are operational. Should an SCR-608 radio become unservicable during a tactical problem it is necessary, in case of major repairs, to send this set to Division Signal Repair. An entire day, perhaps more, may be required for the trip. During the time the piece of equipment is enroute to division and back to regiment, one vital link is not available to the regimental commander. This has happened, and similar problems are constantly before an infantry outfit in the field. *Infantry regiments should be authorized spare equipment, particularly large radios.* T/O&E's are definitely too inflexible, yet the organizations which they serve are expected to be the epitome of flexibility, an impossible situation.

One answer to the T/O&E handcuff is the Equipment Modification List. Recommendations for addition or deletion of equipment are submitted periodically to higher headquarters and, after consideration, may be acted upon and put into effect. The Equipment Modification List is a good system, but there is no guarantee that reviewing agencies are completely familiar with and completely understand the problems of tactical units. These agencies should be thoroughly acquainted with the tactical problems of units they serve.

There should be more attention given these points:

1. Adequate equipment for the needs of the unit. I give this first priority because I feel that the basis for an adequate signal system is equipment which may be integrated into the tactical situation. The best operator in the Armed Forces, employing the finest accepted procedures, following the most strict security regulations, cannot gain communication with a station five miles distant when his radio will transmit only one mile. Therefore, equipment of the correct type and in sufficient quantities should be made available and extensive training conducted in its use.

2. I consider suitable measures to keep equipment operating at all times to be of second priority because you have to get the equipment first or all the training in the world is useless. Training includes functional training of operators and maintenance personnel. At present, the radio personnel dribbled into infantry regiments is not well enough trained to maintain those sets necessary to a combat functioning regiment. Training has been so limited that opening and closing a net about exhausts the talents of many of our communication men. A rifle company radio man knows only the SCR-536 and SCR-300 radios, and these are only slight acquaintances. Scanty knowledge applies to maintenance personnel as well as operators. All communication personnel should be familiar with *all* voice sets. Rifle company communication personnel should know the SCR-610, SCR-619, SCR-508, and SCR-608. And why can't we teach the operator the mechanics of his set? Why must we restrict the training of an infantry radio repairman to second echelon or basic maintenance? Why can't we have personnel in the regiment who are capable of extensive repair of equipment? It is obvious that the greatest need for detailed repair is *within* the regiment and not at higher headquarters. Yet, when a recommendation is made regarding permission to increase the echelon of repair, we are always met with the question, "How will you transport your spare parts?" and, "Where will you obtain personnel with sufficient training to carry out extensive repair?" My answer to this is, "Give us the spare parts and we will carry them; give us the repairmen or some of the repairmen who are in the division signal company and signal corps repair shops at corps or army."

The infantry regiment needs medics on hand and we have them; the regiment needs organic artillery, and we have the mortar company; the regiment needs armor, and we have the tank company. We need radio maintenance men but whom do we have to do extensive repair on radios? Once a radio is out, the commander can count on that link in his chain of control being lost to him until the long haul is made to the rear and back again. What

happens to the control with that link missing? It crumbles and becomes confusion; and when control is lost, everything is lost. The unit is crippled, useless, and a sitting duck for anyone intelligent enough to take advantage of his opportunity. You may call this another version of "The Loss of a Nail" story, but whatever you call it, why can't radio repairmen be placed where their efforts will count?

Our solution to the communication problem in the 26th Infantry could be improved. We feel we can operate effectively, but how many other regiments can do the same, operating under afore-mentioned "normal" conditions.

In the rifle companies we have replaced the SCR-536 in the Company Command net with the SCR-300. You may ask, "If the entire division is so equipped, where do you get enough frequencies?" Actually, enough frequencies are available on a non-interference basis. To date we have had no difficulty with interfering nets.

The weapons company is scheduled to receive SCR-610's, which will be employed in the 81-mm Mortar Fire Control net. Frequencies? We have plenty.

The battalion commander is provided an SCR-608 by T/O&E. We link him with his rifle and weapons company commanders by issuing an SCR-610 to each rifle and weapons company. This substitution eliminates the SCR-300 Battalion Command net which was a farce in our maneuvers, and will prove to be the same in any outfit operating on extended frontages and in great depth.

There are some who might consider that the rifle or weapons company commander will be tied to his vehicle due to the fact that the SCR-610 is not a one-man packload. This is not the case since the radio can be easily dismounted and may be carried easily by two men. The field artillery has successfully employed the equipment in this manner for years. It's not easy but the infantry can do it too.

Should we encounter a situation in which we operate on *normal* frontages and under normal conditions, our T/O&E equipment is available. The SCR-300 for example may again be used in the Battalion Command net and the

SCR-536 in the Company Command net.

Our tank company employs T/O&E equipment. We have found the SCR-508 and SCR-510 to be satisfactory. The AN/VRC3 (SCR-300) is efficient for operation within rifle companies.

We have three nets at regimental level: An AM-CW or Voice Command net, an FM-Voice Command net and an FM-Voice Intelligence Information net.

The Regimental AM Command net employs the SCR-506. It is used in lieu of the SCR-694 which we are presently authorized: The SCR-506 offers us 50 miles CW and 15 miles voice. This net is primarily used to clear messages of comparatively low priority. Stations included in the net are: regimental commander, the three battalions, heavy mortar company, service company, and regimental S4. The SCR-506 is an Equipment Modification List item and is remarkably well suited to our needs. It is sturdy and does not easily slip off frequency. All CW operators are trained to operate this set .

The Regimental FM-Voice Command net employs the SCR-608 and the SCR-508 on the overlap frequency band. Stations included are: regimental commander, regimental S3, the three battalion commanders, regimental command post, heavy mortar company, tank company, medical company, regimental executive officer, and regimental communication officer. This is normally a controlled net due to the large number of stations. The regimental S3 acts as Net Control Station.

At this point let me discuss a highly important subject about which too little is known and to which too little attention is paid. This is *relay*. Even with the SCR-608 and SCR-508 we are frequently unable to contact a station, particularly while moving. In order to clear a message, it is necessary that the message be relayed. The highest degree of control over the net is mandatory and all stations must be alert to relay at any time. In this regiment, relay is the rule rather than the exception. Light aircraft are often employed as relay stations, particularly when the regiment is moving in column. On numerous occasions, the only voice contact available to the regimental commander

with his battalion commanders is by relay through a liaison aircraft. I strongly recommend that practice field nets and radio-telephone instruction include many hours of practical experience in relaying voice messages.

The Intelligence Information net utilizes the SCR-508 and links the regimental S2 with the battalion intelligence officers and the I&R platoon leader. This net is invaluable in that it provides a direct information channel for the regimental commander. It is also on the overlap band and may be integrated into the regimental command net if necessary. It is noteworthy that the squads of the I&R platoon employ the SCR-610 and SCR-510 rather than the T/O&E authorized SCR-300.

Radio contact with division is maintained with the SCR-399. The SCR-399 is not only a part of the signal equipment of the regiment but is operated by *regimental* radio operators. It is interesting to mention that every radio operator in the regimental communication platoon is capable of operating the SCR-399. This set has the distinct advantage of extreme range, but it is bulky, heavy, and not sufficiently mobile to remain with the regimental commander at all times. Therefore, a quarter ton mounted SCR-506 (auxiliary station) accompanies the commander and relays his messages to division through the SCR-399, which remains in the headquarters company area.

Wire communication between division and regiment is virtually non-existent. The AN/TRC 3 radio relay is used almost exclusively. Two relay teams are attached to each regiment in every situation. One team is operative; the second is kept in readiness for displacement.

If time permits, wire is installed between the regimental command post and all battalions, heavy mortar company, tank company, service company (trains), and medical company. It is not unusual that the shortest wire line installed by the wire section of the regimental communication platoon is over five miles in length. It can be readily seen that three wire teams would require too much time to construct wire circuits over these distances. Our regiment normally employs a minimum of four wire teams and often six.

Displacement of the command post follows accepted doctrine only in so far as displacement by echelon is concerned. There, the similarity stops. Our regimental command post displaces as follows: the communication platoon leader—accompanied by a message center team, two or three wire teams, an AN/TRC team, and one SCR-506 (for communication to the rear command post)—closely follows the billeting party to a previously designated area. With the agencies at his disposal, the communications platoon leader establishes a skeleton command post. When the forward AN/TRC team gains contact with the division command post, the rear elements of regimental headquarters move forward. There are frequently no wire lines on which to displace either forward or to the rear. Due to the fact that movement of the regimental command post is measured in terms of miles rather than in yards, the greatest problem in wire communication is certainly not the initial installation, but rather the maintenance of wire circuits after they have been installed. There are those who contend that we should depend entirely on radio. However, it is our belief that, if time, wire, and wire teams are available, wire should be installed. This regiment employs wire communication in every situation, except motor movements, and has found the use of wire to be highly profitable.

Supply and maintenance present many difficulties which have to be overcome. I am firmly convinced that most of the problems encountered could be solved by *emphasizing supply* during training.

Maintenance instruction must be stressed. I feel that the individual must know everything that we can possibly teach him regarding his equipment. Let's not continue to depend on a technical service to solve our maintenance problems; let's work them out ourselves.

I say again, *normal* situations are too few in number. We, as the so-called communication specialists must accept this and plan and present our training programs with this idea always uppermost in our minds. We must think in terms of flexibility both in teaching and practical application. We must indoctrinate those whom we advise and serve with this truth.

Movement by Air

By Maj Knut H. Raudstein, Infantry

So the heat is on, and you are anticipating orders to move your regiment by air. Relax, haul out your SOP's for any other type movement, and while the staff dusts them off, you can do a little planning that will save a lot of time and anguish.

Assuming that you have received some information as to what your mission will be, how much of your impedimenta can you leave behind and still accomplish the mission? Better consider that you may not have sufficient airlift to move you and yours all at one time. If so, what are the priorities on movement? Will you need men more than material? Do you want to take the maximum number of *full strength* units, and leave some units behind? Or would you perfer to have all your units, even though stripped down, with your *nonessentials* left behind? It will pay off to consider this immediately so your future planning can be a little more flexible.

Your staff will need additional help in planning this move. If you have a recent Benning graduate around he at least will have been exposed to some of the staff problems. Round him up and put him to work digging up characteristics of aircraft and, with your S4, figuring which of your major items of equipment are air transportable in each of the aircraft you're most likely to get. Remind him to consider not just weight, but dimensions as well. TM 71-210, AIR TRANSPORT OF TROOPS AND EQUIPMENT, and Command and General Staff College Special Text 71-30, AIRBORNE OPERATIONS, have tables that will be a big help. Concurrently with this project, they can plan what modifications can be made to make the maximum amount of equipment air transportable. For example, the 2½-ton trucks will probably go, but not with the AA gun ring mount installed; nor will the knock down ambulances go in some aircraft with the top ventilators left on.

Brief your next best airborne expert on his potential job —acting as your liaison officer at the departure airfield. His most important functions will be: (1) Determining and informing you at the earliest possible moment of the number and type of aircraft you'll get; (2) getting a firm commitment from the Air Force on the maximum load you can carry in each aircraft. Until you know this, you are planning in the dark and your staff officers are knocking themselves out making alternate plans.

Have him find out all of the details concerning the move that he can: Are there any peculiarities about the aircraft that may interfere with your S4's loading plans, such as radar rigs or auxiliary gas tanks in the cargo compartment right where you planned to have a truck; the availability or non-availability of loading ramps or other loading equipment; are load spreaders needed for your heaviest items of equipment and, if so, who will furnish them; who will have the responsibility of loading your equipment, the Air Force, Transportation Corps, Quartermaster, or you; is anyone planning the details of how and when you are to be loaded, and, if so, who, and how about all the information available on this; what system will be used to determine safe loading for the individual aircraft—the inch-pound-moment system, the compartment system, or what; where will your troops be while awaiting loading, at a marshalling area near the airfield, or prepared to load with no delay enroute from your present station; are CP facilities available for you, and will communication be provided; and, of most importance, *how many of what kind of aircraft* and *what will they carry?* Prepare a set of questions for him, and give him all the data you already have.

Your higher headquarters will provide much of this information, but if not, better make sure sombody gets it for you because it covers all the basic considerations that will affect your planning and activities. With this information, you can decide who and what can go and in what priority, and plan for the disposition of your non-airtransportable men and material. As soon as your plans are formulated, and in the hands of your liaison officer, he can go over them in detail with the experts at the field. This way if

troubles arises, you will be informed early enough to prevent a major tie-up.

Your specific loading plans are dependent on your knowledge of the individual airplane you'll use. The AIRBORNE OPERATIONS special text indicates several methods by which you can compute your aircraft requirement, or to state it more accurately, what you can put in the aircraft available. The total airlift capacity available, expressed in pounds, is the most important planning figure you need. Following any of the planning methods referred to above, you can roughly determine your organization for the airlift.

Some echelon will have to determine the exact content of each aircraft. If you decide to apportion the available airlift to your units, you should indicate approximately what you will expect those units to accomplish at their destination so their staffs will have something on which to base their plans. If, on the other hand, you undertake to prescribe what each unit will transport in the way of major items of equipment and man power, you may as well finish the job, and do all the detailed planning at your headquarters. The important thing is that you must know what each unit will be capable of accomplishing once it is on the ground. The details of staff planning are thoroughly covered in the AIRBORNE OPERATIONS special text, and additional assistance is available in FM 71-20, AIRBORNE TECHNIQUES FOR DIVISIONAL UNITS* and TM 71-210, AIR TRANSPORT OF TROOPS AND EQUIPMENT. Preparation of the Basic Planning Guide, Aircraft Allotment Tables, Air Loading Tables, and Flight Manifests will not be much of a task for an alert staff using these guides.

Immediately after orienting your liaison officer on his duties, you'll want to talk to your S3 about schools. Your schools should be pointed at making the individual capable of accomplishing his particular job rather than having the whole outfit expert in all phases of air transported operations. Again you make a decision. Are you going to have

*FM 71-20 is now being printed. Distribution is expected at an early date.

specialist teams, or would you prefer to have all your enlisted men capable of loading aircraft? A basic consideration is that every aircraft must carry enough of your people as passengers to unload it. That means all of your men must be familiar with the restraint system used.**

In about 25 hours, you can train all your people to the point where they can load their unit impedimenta. They will need to know flight safety precautions, conduct at the airfield, and a few basic knots. They must be impressed with the need for properly balanced loads and adequate restraint, the operation of mechanical tie-down devices, how station numbers are located, and they should have sufficient familiarity with aircraft to know that some of the tie-down rings are not suitable for restraining vehicles.

All of your officers should know how to inspect a loaded aircraft to determine if the restraint is adequate, and how to complete a Flight Manifest. The drivers must be able to prepare their vehicles for loading to include restraining the load within the vehicle. The non-coms must be able to read sketches showing how loads are positioned and restrained in aircraft, and able to direct a detail loading the aircraft.

Mimeographed floor plans of the aircraft to scale save both planning and loading time. On these floor plans the planner sketches the outline of the load, indicating its center of gravity, and the station number over which the load center of gravity must be placed; the terminal points of the tie-down device on the load and tie-down ring by station number; the number of men and their seats; and the total weight of the planned load. This sketch is given to the loading detail, and remains in the aircraft until take-off time. Using a scale floor plan for the aircraft (Figure 1) together with templates of common loads to the same scale (Figure 2) saves even more planning time. These are used by placing the planned load cutout templates over the floor plan while the load is being computed. This shows immediately if planned loads will fit. When the load is deter-

**"Restraint system" is the technical term for the system of lashing and tie-downs designed to prevent shifting of the load in the aircraft.

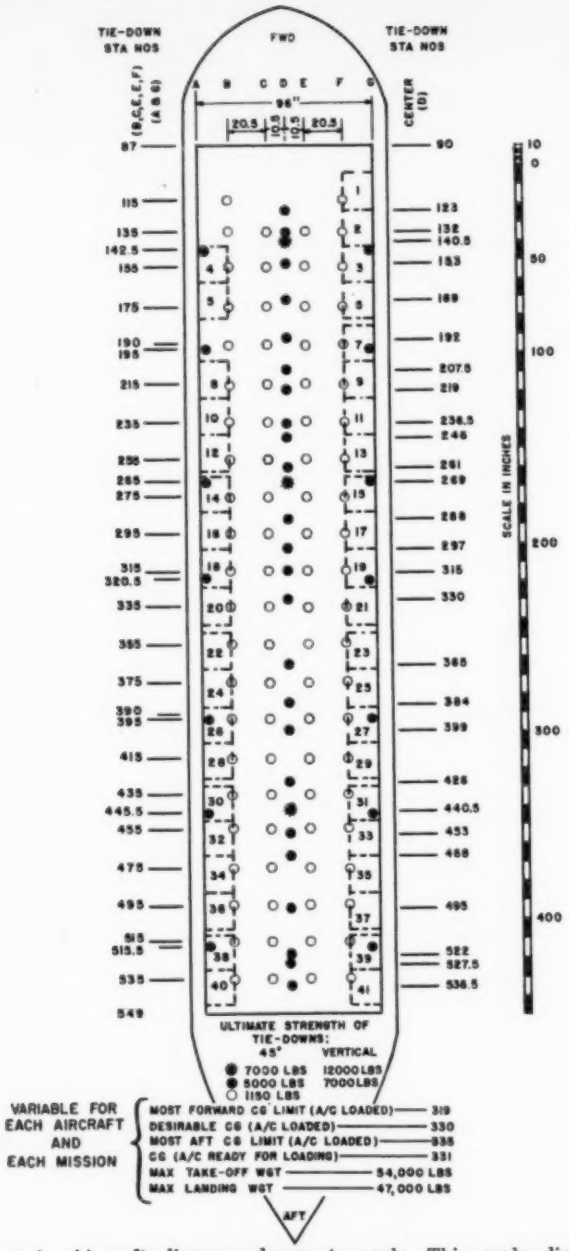

Figure 1. Aircraft diagram drawn to scale. This scale diagram, showing locations of tie-down rings and their station numbers, is used in conjunction with templates of vehicles and other load items drawn to the same scale as the aircraft diagram. Used together, diagram and templates cut many hours from the task of figuring aircraft loads.

mined to be flyable, restraint criteria is computed and the location of the tie-down rings is determined. This data is then transcribed on the mimeographed floor plan together with the computations and no additional computations are needed (Figure 3).

A planning factor frequently neglected is the weight of equipment loaded into the vehicles. It is not uncommon to see a 2,500 pound quarter-ton truck presented for loading into an aircraft with over 800 pounds of equipment piled in the back seat. Obviously, the center of gravity of the vehicle has shifted, and the original load computation is invalid. Someone has to determine early in the planning

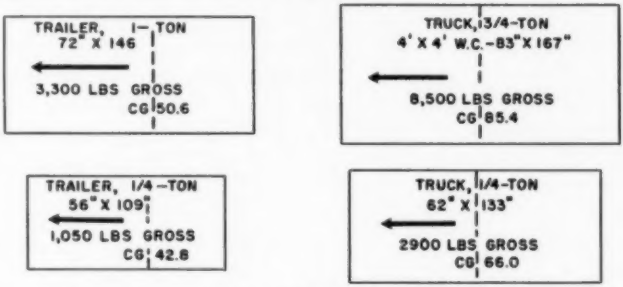

Figure 2. Templates of vehicles and other load items are made to the same scale as aircraft diagrams with which they are used in figuring loads. Templates can be as simple as cardboard cut-outs, whose length and width are the scaled down dimensions of the load items which the cut-outs represent. More useful templates are constructed of acetate, or similar transparent substances, through which the location of tie-down rings on the aircraft scale diagrams can be seen. This makes for easier planning of the necessary restraint for each load item. (Arrows indicate front of vehicles.)

just what load all vehicles will carry, and those figures must not be exceeded. Otherwise, someone may be reloading an aircraft at take off time.

Initially, classify your vehicles and equipment as that essential for combat and that which is purely administrative impedimenta—such as the Special Services paraphernalia. For each company, prepare a loading plan for each type vehicle. Determine what is to go in each vehicle, and where it is to be placed in the vehicle. Indicate precisely what space and weight is available to the armorer, the

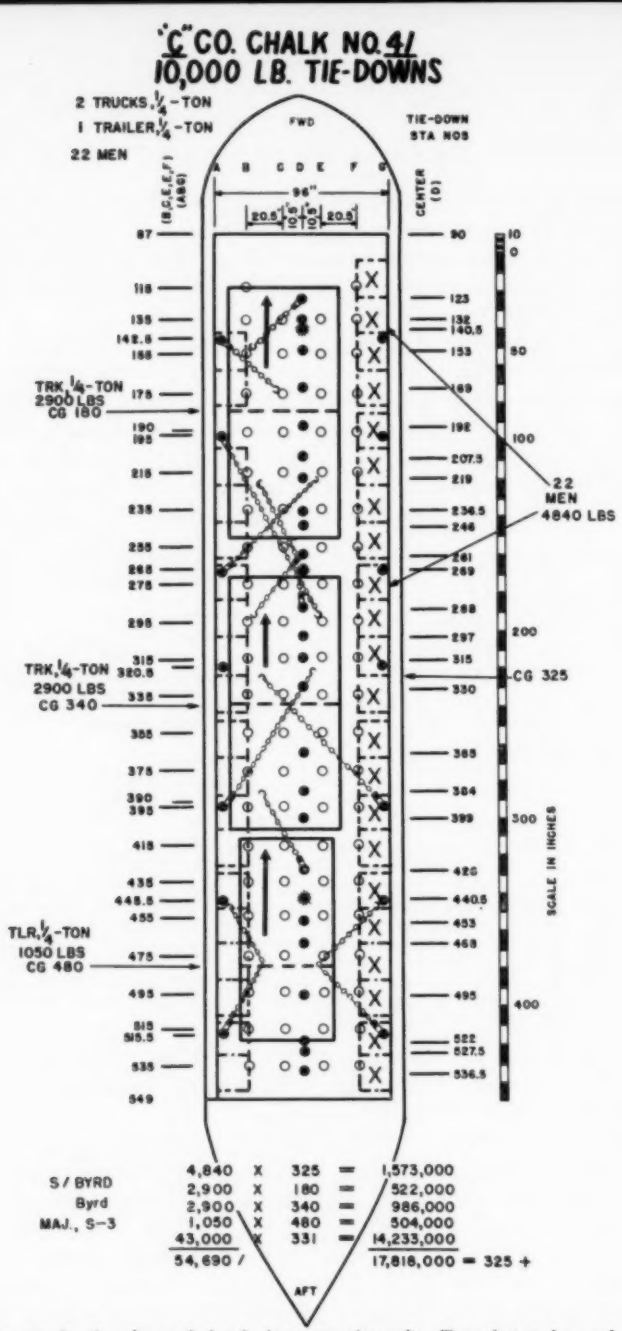

Figure 3. A planned load for an aircraft. Templates have been used to determine whether loads will fit in the aircraft and computations have been completed for aircraft balancing. This is the diagram as completed by the S3 for distribution to the aircraft loading detail. This particular plan is marked for use by C Company of the organization.

clerk, where the Lister bags go, and where to locate whatever other equipment is considered combat essential.

With the concurrences of the battalion and company commanders, prepare your SOP for type vehicles and stick with it. Then compute the center of gravity of each type vehicle and paint it on the designated spot. If the center of gravity cannot be determined mathematically, each axle load* should be weighed at the Post coal yard or on a civilian scale, and the axle load painted above the axle. Mathematical computation of the center of gravity is then simple. This datum should be retained for an SOP that indicates the total weight, distribution of weight, and the vehicle bumper number. Such a system will eliminate many plane side arguments as to where the center of gravity is, and how much the load weighs.

At the conclusion of the schools, with everyone oriented on his responsibilities you can check your SOP's and get additional information for them. Do this by running a staff planning exercise with an arbitrary airlift prescribed. Follow up with a dry run by representative units with nothing simulated, except loading into actual aircraft. Then rehearse. Require each outfit to prepare itself for air movement according to the loading SOP. Inspect each vehicle for conformity with the SOP, and then require the vehicle to be passed through a mock-up of the cargo door frame of whatever type aircraft you anticipate moving in. This door frame can be as simple as three two-by-fours with appropriate obstacles to indicate such protuberances as monorails and seats. This will show clearly whether or not a load will enter an aircraft and whether the vehicle needs modification or the load needs restowing. With the mistakes and omissions rectified, the planning exercise and rehearsal will take the bugs out of your SOP, and the problem of air movement is whipped.

Your SOP may look something like this:

SOP for Movement by Air:

S4

1. Require Motor Officer to mark center of gravity and

*"Axle load"—The weight borne by the axles of the vehicle. The sum of the weight of the front axle load and the rear axle load is the total weight of the vehicle and its load.

axle load on every vehicle and retain record of same for S3.

2. Assists S3 plan overland move to departure airfield.
3. Secure necessary transportation to airfield.
4. Draft administrative order.
5. Determine through liaison officer, or other source, total airlift available.
6. Secure decision from commander on priorities of equipment and supplies to be airtransported.
7. With S3, make a tentative loading plan.
8. Determine need for load spreaders, tie-down material and loading facilities.
9. Prepare unit vehicles for air movement.
10. When the capacity of each aircraft has been definitely stated, and the S3 has established the priority of material to be moved, supervise the loading and lashing of material into unit vehicles.
11. Supervise aircraft loading.

S1

1. Provide S3 with present strength figures, and estimate strength of command on M (Movement) day.
2. Orient liaison officer on CP requirements and communication needs.
3. Establish communication system with liaison officer.
4. Determine from S3 the composition of the airtransported party, the land tail, and the rear echelon. Make arrangements for administration of same.
5. Assist S4 in preparing administrative order.
6. Upon arrival at airfield, secure sketch of CP facilities, troop billet areas, and air field commanders installation from liaison officer. Establish CP and communication system.

S2

1. Routine for any move.

S3

1. Deduce most probable type aircraft to be employed, and make tentative plan for transportation of minimum requirements of equipment and supplies transportable in that type aircraft. Weigh unit's capabilities with minimum vehicles and mission orders.

2. Orient liaison officer on information requirements: Type aircraft to be used; number available; how many serials or what formation to be flown; cargo capability of each individual aircraft; unusual load limitations; desired center of gravity of aircraft; load computation method to be used; time desired for troops' arrival; time loading begins; take-off time of serials; flying time to destination; unusual safety precautions; tie-down requirements; agency responsible for loading aircraft; and troop billeting facilities.
3. Acquaint S4 with all information as it becomes available.
4. Prepare tentative plan for movement from arrival airfield to new destination so that troops and equipment can be phased into departure airfields in the right priority.
5. Brief unit commanders on mission requirements and equipment needs insofar as they can be foreseen.
6. Upon receipt of information from liaison officer, make tentative loading plan. Confer with S4 on maximum load per vehicle and restrictions on type vehicles. When agreement with S4 is reached, present plan to commander and subordinate unit commanders.
7. When complete and final agreement is reached, prepare final loading plan.
8. Prepare sketch of each type load showing centers of gravity, tiedowns, troop seats, total load, all computations, and reproduce in sufficient quantity for each aircraft to have copy of its type load.
9. Coordinate with S2 on troop briefing and security requirements.
10. Prepare operation order, if required.
11. Supervise loading and lashing schools.
12. Confer with airfield commander and air lift commander. Coordinate details of move. Secure aircraft parking diagram for own and S4 information.
13. Insure that individual aircraft are plainly marked.

Rifle Platoon in a Night Attack

By Capt Charles K. Blum, Infantry

Sgt. Mons, the last squad leader to arrive for the platoon attack order, crawled into the protection of the south slope of Hill 97. He dropped into a shallow crater with a sigh of relief.

Lt. Adams, from his position in an old Aggressor fighting hole, turned from Mons to the others. They were all there —his squad leaders and platoon sergeant and the attached 60-mm mortar and 57-mm rifle squad leaders. Not bunched up or away from cover either, he noted. He glanced at his watch. 1619—a little more than an hour before darkness.

"Can everyone hear me?" he asked. They all nodded.

"The platoon's done a fine job so far in the attack," he said. "Now, the night attack I told you about in my warning order a half hour ago is on. It'll be over the terrain to our front. It's to be as secret as possible—so no illumination or preparatory fires unless we're discovered."

He paused a moment before continuing. "I want two of you at a time to crawl up with me where we can see to the front. I'll orient you on the terrain there. Here's an operation sketch of the ground each of you can be studying."

The men came over one at a time to receive their copies. (See Figure 1, Operation Sketch.)

"When we're all back here again, after the terrain orientation, I'll give you the order. Any question?. . . . .Mons, you and Sgt. Brown come with me first."

He crawled with slow care into a spot from which he could look north from Hill 97 toward Hill 103 and the town of Cisterna. Far off on the right an Aggressor machine gun hammered. He paused to see whether his two squad leaders were also in position to look across the same terrain.

"Look at your operation sketch. We're here on Hill 97. Over on our right is the road that shows on your sketch. If you look straight out to the front, you see Hill 103 some 800 yards away. There's a single house on the hill, with

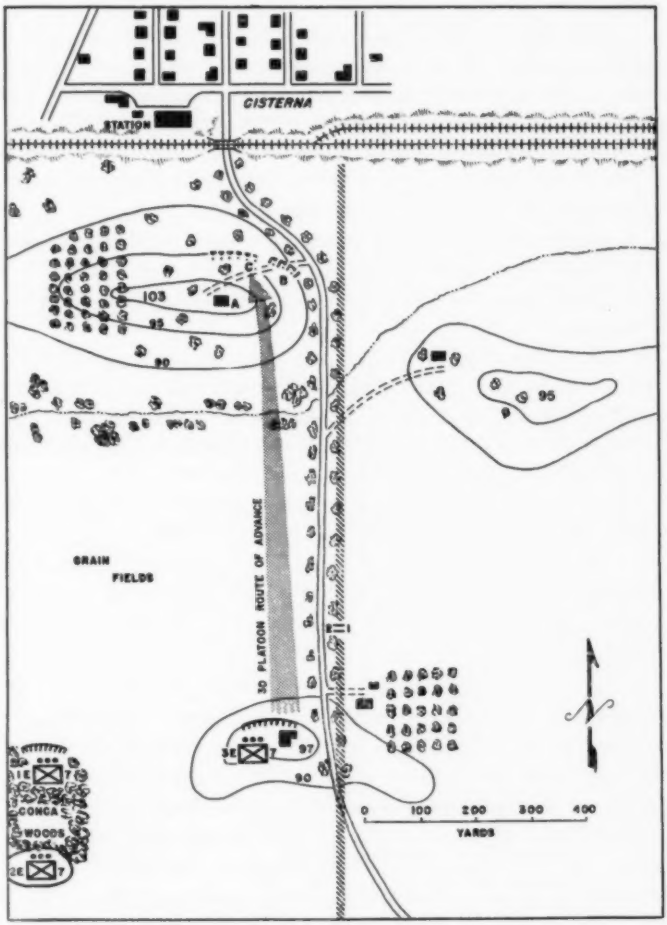

Figure 1. Operations sketch.

an orchard behind it. The orchard is to our left as we look at the house. The building itself is marked with an *A* on the sketch. Do you both have that now? . . . Okay, beyond Hill 103 is the town of Cisterna, our regimental objective. You can see the tops of some of the taller buildings from here.

"Now, look at Hill 103 again. Just short of the hill is something that looks like a hedge line. Those are bushes and other light underbrush along a small stream. The stream is only a foot or so deep and about 8-10 yards wide . . . so we can cross it easily. Between us and the stream is the same stuff we've seen all along—waist-high grain in a flat field, with some red poppies for variety.

"The road on our right is the battalion right boundary. You'll see by your sketch that the road curves behind Hill 103 before crossing under the railroad tracks and entering Cisterna.

"Take a good look at the terrain between here and Hill 103. That's our zone of action—from the road left 175 yards. On Hill 103 itself we're responsible for the area between the road and House *A*, inclusive of both. Any questions?"

Sgt. Mons shifted position slightly and asked, "How about the hill over in 1st Battalion's zone—Hill 95?"

"That's 1st Battalion's objective tonight."

"Good," said Mons. "It'd be bad if we were on Hill 103 tomorrow at daylight and Aggressor held Hill 95 behind us."

"Take a close look now at the parts of Hill 103 which the 2d and 1st Platoons will capture," Lt. Adams said. "They'll be moving up parallel to us tonight—each with its own point of departure and route forward. 2d Platoon will take the center of the hill; 1st Platoon, the left third."

Mons and Brown finally backed down and two other squad leaders took their places near Lt. Adams. It took almost ten minutes to orient all the squad leaders. Then he returned to his old hole, and consulting a tattered notebook, began his order.

"There's roughly an enemy platoon on Hill 103. Our regiment attacks tonight, with George Company on our left, 1st Battalion on our right. This company attacks with three platoons abreast to seize and hold Hill 103—1st Platoon on the left, 2d Platoon in the center, and our platoon on the right. 3d Battalion passes through us at 0700—that's a half hour after daylight—to capture Cisterna. Artillery and mortar fires, including a preparation on Hill 103, have been planned for our attack; but we'll use them only if we're discovered. Protective fires for our reorganization have been planned to fall just beyond the limit of advance, which is the railroad tracks.

Lt. Adams paused and looked around at his men. "Anybody want a repeat on that information? You, Mons?"

"No, sir."

"Brown?"

"No, sir."

"Anybody else have a question?"

As no questions were asked, Lt. Adams continued.

"This platoon is to capture and hold the right third of the company objective—Hill 103—from the road on the right to and including House *A*. That's our mission, so underline it in your notes.

"We're the right platoon and base platoon tonight. Our zone of action is the area from the road left 175 yards. It includes the road. The direction of attack is 360 degrees and our point of departure is our present position.

"The time of attack is 0400. That gives us enough time on the objective to reorganize before daylight."

"Why are we attacking so late tonight, sir?" a squad leader asked.

"That's to have Aggressor still off balance when 3d Battalion pushes through us a half hour after daylight. Enemy troops won't have much time to get set again in rearward positions before a new attack rolls over them."

"I see, sir."

Lt. Adams took a fresh look at his notes before beginning again.

"The squad release point will be the near or south bank of the stream. Our probable line of deployment is the north bank of the stream. A squad from the 2d Platoon will provide security at the line of deployment and send a guide back for us. If we get to the line of deployment without being discovered, get your men up on line and have them lie down and wait for the signal for the assault. That signal—everybody get this—is the bursting of a concentration of white phosphorous artillery shells, probably not more than six in number, on the top of Hill 103."

Adams looked around at his men. "Let's not have anybody jump the gun tonight on that signal," he cautioned. "And let's not be slow in obeying the signal, either, when it does come."

"Do we hold our fire as we move forward from the line of deployment?"

"Yes, until we are discovered. Then open up with everything."

"And if a flare goes up?"

"If one gets up *before* we get to the line of deployment, hit the ground and keep your head down. If a flare is fired *after* we start moving forward from the line of deployment, stay on your feet and keep going. In fact, when our attack is discovered, we'll have some of our own rifle grenadiers fire flares over and behind the enemy positions to help us. I'll get to that part in a minute."

He took time to light a cigarette and to draw a long puff on it.

"Any more questions about the flares?"

The men shook their heads.

"I've already told you about the limit of advance," the lieutenant said. "That's the railroad tracks. We don't expect to go that far, of course. Our protective fires are being planned to fall just beyond that line. Mons—"

"Yes, sir?"

"Your squad is the lead squad and base squad in a platoon column formation as far as the squad release point. Guide on the road and stay about 70 yards this side of it. You'll be able to see the roadside line of trees easily. For

the assault you're the right squad and base squad in a platoon line formation. You're responsible for security to our front and to your flanks during the advance. Try to eliminate quietly any enemy elements we may meet. I want you to have two rifle grenadiers fire flares over the objective when our attack is discovered. Keep the flares over and *behind* the Aggressor positions."

"Yes, sir."

"Brown, your 2d Squad will follow the 1st Squad in the platoon column formation. During our advance to the stream, you're responsible for security to your flanks. You're the center squad in the assault. Have two rifle grenadiers ready to fire flares if we don't get enough light from the ones the 1st Squad fires. Any questions?"

"No, sir."

Lt Adams turned to his 3d Squad leader.

"Have your men follow the 2d Squad in the platoon column formation. Provide security to your flanks. In the assault you're the left squad in the platoon line formation. Be sure to tie in with the 2d Platoon at the line of deployment and in reorganization."

"Right, sir."

"The Weapons Squad follows the 3d Squad in the platoon column formation. Stay under cover of the stream bank during the assault. Come up to us when you see that we've captured the position. On the objective the LMG team will go into position where I've marked the letter *C* on the operation sketch; the rocket-launcher team, where I've marked the letter *B*.

"The 57-mm rifle and 60-mm mortar squads will rejoin the Weapons Platoon and come up as part of that unit—after Hill 103 has been taken. As soon as it's dark, you two weapons squad leaders are to report to the Weapons Platoon leader at the company CP in Conca Woods without your squads. The CP is where 2d Platoon's position is marked on your sketch. When you rejoin us on the objective, I want the 60-mm mortar prepared to fire from the center rear of the platoon—particularly on targets approaching from the right flank. The 57-mm rifle I plan to

have join the 2d Squad, in the center of our line. Watch for automatic weapons along the railroad embankment and in the buildings in Cisterna. Any questions on your jobs?"

Both men seemed satisfied.

"I've shown the reorganization plan on your sketches. We'll tie our left flank in with the 2d Platoon. That's the job and responsibility of the 3d Squad.

"For identification, some luminous tape is being sent up to us tonight. I want a narrow vertical strip of this tape on the back of the squad leaders' helmets. In platoon headquarters, we'll have a single wide *horizontal* strip on the back of our helmets. Everybody else will have a white handerchief or rag tied around the right arm just above the elbow.

"Get across to your men that we want to reach the line of deployment without being discovered—then open up with everything. If a flare goes up *before* we're in the assault, hit the ground. If a flare goes up *after* we're in the assault, stay on your feet and keep going.

"Ammunition and luminous tape are being brought up by carrying party after dark. We'll distribute it then. 1st and 2d Squads, be sure to pick up your rifle flares. The battalion aid station is in a ditch near the road, about 600 yards behind us.

"Radio silence begins now and is in effect until the enemy discovers our attack tonight. The signal to show this platoon has captured its part of the objective is a red star cluster. The company commander will be just in rear of the 2d Platoon tonight. I'll be with the lead squad in the platoon column formation; the platoon sergeant will be with the 2d Squad; and the assistant platoon sergeant will be with the rear of the column. In the assault I'll be on the right, the platoon sergeant in the center, and the assistant platoon sergeant on the left . . . The time is now 1644. Are there any questions?"

The squad leaders asked their questions and shortly the last man was satisfied that he understood thoroughly the plan of attack. Lt. Adams watched them crawl across the hill back to the hasty positions which the squads were occupying on the north slope.

He thought briefly of the coming night attack—and of how the platoon plan fitted neatly and accurately into all that he and his men had been taught. On a sudden impulse he drew a rapid sketch on a blank page of his notebook and studied it. (See Figure 2.) He smiled as he compared the schematic diagram of a night attack with the platoon order and the actual terrain over which they were to attack. Yep, the essentials were all there—every one.

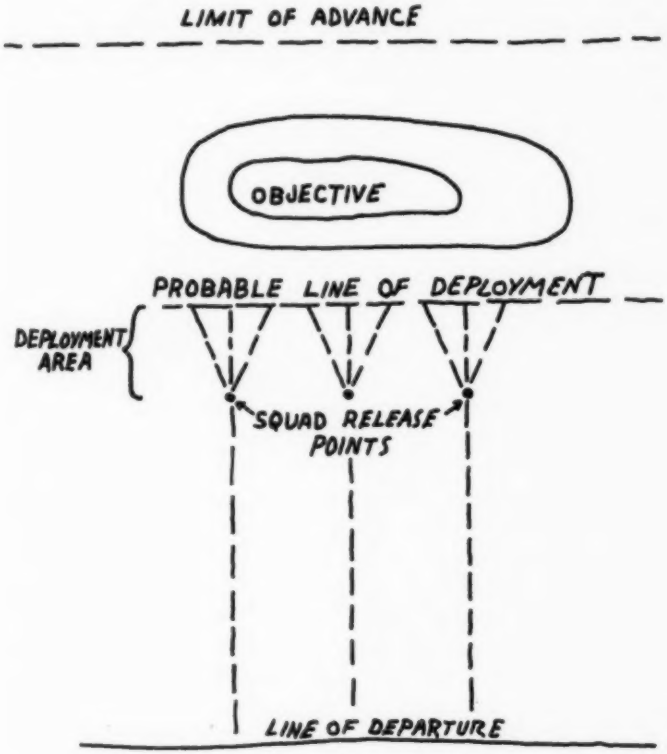

Figure 2. Schematic drawing of a rifle company night attack, three platoons abreast.

He watched friendly artillery fire being adjusted on Hill 103. An HE shell tore into the battered wall of House *A* and sent up a cloud of dust and rubble. As though that round were a signal, the shelling ceased. He muttered to the unseen forward observer who had adjusted the fire, "Make your WP rounds that accurate tonight and I'll be happy."

His platoon's positions were suddenly given a bad five minutes from enemy mortars. Shrapnel whined and shrieked over Hill 97 as the shells hit and burst. More of the rounds were overs, however, than actually hit among the platoon positions. The concentration ceased as abruptly as it had begun.

A quick checkup, with questions and answers called back and forth from foxhole to foxhole, revealed only one wound —and that a slight cut in the shoulder of Sgt. Brown, a man often hit but never seriously.

After darkness a party from company headquarters came with wire and a sound-power telephone. Lt. Adams talked briefly with the company commander over this line, learned that the day had been a successful one for neighboring units in the attack, and put down the phone just in time to greet the carrying party bringing up rations, ammunition, and other supplies. There was a busy stir and movement in the dark as the platoon received and distributed these supplies.

The squad leaders of the 60-mm mortar and 57-mm rifle squads reported to him briefly and then disappeared into the dark toward Conca Woods and their own platoon leader.

He found time to eat his meal. The warm food tasted good and the coffee somehow imparted its own subtle strength and energy to him. Finished eating, he climbed from his hole and moved around the platoon positions in the dark, checking the preparations for the attack. He ordered half the men to remain alert and on guard, while the other half rested. He dispatched two listening posts about a hundred yards in front of the platoon's positions.

The platoon runner from company headquarters almost stumbled into the hole a little later as he searched for the

lieutenant in the darkness. The runner had the new challenge and password. He muttered them to Lt. Adams in a voice attuned to the quiet unease of the battlefield night. Adams sent the platoon sergeant on a round of the positions with the challenge and password.

The platoon sergeant returned about midnight and Lt. Adams stretched out in the uncomfortable hole, pulled his field jacket tightly about him, and sought an hour's sleep.

When at last he felt the hand of his second-in-command shake his shoulder and he rolled over and stood up, muscles cramped and uncomfortable, it was 0330.

"I thought you could use the extra sleep, Lieutenant," the sergeant explained.

"Thanks, Sergeant. Everything quiet?"

"Yes, sir. All the men are about ready."

"The 60-mm mortar and 57-mm rifle people still with us?"

"They left about 20 minutes ago."

"Any word from the company?"

"No, sir. But the 2d Platoon patrol to provide security at the line of deployment has been gone some time. I heard the company commander talking to 2d Platoon a few minutes ago. He thought the silence up in front of Hill 103 was a good sign."

Lt. Adams picked up the phone and whistled into it. A thin voice answered: "Company CP."

"Is Capt. Kenny there? This is Lt. Adams."

"Just a minute, sir."

The company commander came on the line.

"We're standing by down here now," stated Adams. "You'll still give us the word to move out?"

"Right. Have you heard from your guide yet?"

"No, sir."

"The guide for the 2d Platoon just got back. He said the security at the line of deployment was posted without a hitch."

"Fine."

"Let me know when your guide gets there."

"Right, sir."

Almost as though in answer to his conversation with the company commander, a man loomed up in the night beside his hole and whispered, "Lt. Adams?"

"Yes."

"I'm to guide you forward, sir."

"All quiet up there?"

"Yes, sir."

"Wait here. I'll be back."

He went forward to check with the squad leaders. Everyone was ready. The men began to climb from their holes and form in loose squad columns. A glance at his watch showed 0355. Five minutes to go.

He returned, called the company commander, and reported the presence of his guide.

"That makes the last of them, then," replied Capt. Kenny over the wire. "Three minutes to go."

Lt. Adams sent the platoon sergeant up to where the platoon was shaking out into formation. The guide went along. The early morning silence and darkness were a little unreal. He thought longingly of a cigarette and then heard Capt. Kenny's voice come brittle over the phone:

"Move out, Adams . . ."

He handed the phone to the platoon runner, who began disconnecting it. Then he strode across the hilltop to the head of his platoon. The indistinct shapes and figures of his men loomed on either side— not too crowded, not too dispersed.

The guide and platoon sergeant were standing at the head of the line, waiting.

"Let's go," he said to them in a low voice. "Sergeant, check the line as the men pass and then catch up to your position."

"Right, lieutenant."

Lt. Adams moved out behind the guide. The 1st Squad followed him, stepping lightly down the north side of the hill until at last they were moving through a waist-high growth of grain.

He dropped back and let two men, accompanied by the guide, precede him. The runner caught up to him and took

up a position a little to his rear. He found Sgt. Mons, the squad leader, at his side and for several minutes they walked along in silence. Then Adams whispered:

"Too fast, Mons. We'll lose somebody at this pace. Have your people and that guide slow down a bit."

The sergeant slipped on ahead. Adams saw him catch up with the first man, pause to whisper to him, and then move off to catch the others. The pace slowed almost immediately and the platoon leader nodded to himself. Much better.

He dropped back still farther, looking for the platoon sergeant. Not finding him, he left the runner to contact the sergeant and he himself hurried to move up once more into the 1st Squad's ranks.

The column halted. The men sank to the ground. He slipped past prone figures toward the head of the column to learn what the trouble was. He found the security element halted where a wire draped across their path.

"Nothing but an old communication wire," Sgt Mons was saying. "Get going—but step over the thing carefully, anyhow."

A good sergeant, this Mons. He instructed the first man past to stop and warn everyone to step over the wire and then himself moved off after his lead men. Lt. Adams followed.

A far-off machine gun sounded, stopped, stuttered hesitatingly twice, and then was still. The bleached and bloated carcass of a cow loomed up slowly and was passed. It disappeared at last into the night. Only its smell remained.

Suddenly from somewhere behind Hill 103 a mortar coughed. Lt. Adams looked up and, just as it got to the top of its arc and began to fall, could see the fiery tail of an illuminating mortar round in the air above the hill. He hit the earth just as the round burst with a loud pop and white light spread overhead. He could hear the thing burning and spluttering as it floated down on its parachute. All was strangely silent except for the hissing light. He hoped his men had hit the ground fast—enough that they were low enough to escape notice. No way to tell, however.

Just wait—wait for the tell-tale sound of enemy weapons opening up and the angry snap of rounds tearing through the wheat in search of them.

The flare hissed a last time and went out. Only a red spot floated through the air to show where it still hung from its chute and floated earthward.

Lt. Adams stood up, grateful for the sudden darkness. The mortar did not sound again. The enemy on Hill 103 were silent. His column began to move forward, a little slower than before.

The column halted once more, hesitated, gathered itself together in the night, and then fumbled forward. A shell from some friendly gun far in the rear caught up to them, passed high overhead, its passage only a soft slow sigh. The men in the column heard it explode hollowly far behind the Aggressor lines.

A second flare, this time over in the 2d Battalion zone, caused the men in the 1st Platoon to hit the ground once more. Lt. Adams risked a look around. Almost directly ahead he discovered the underbrush marking the stream. When the flare died out, he moved with silent swiftness to the head of the line and halted it.

He whispered to the guide: "Isn't that the stream up ahead?"

"Yes, sir."

"How many of your patrol are over on our part of the line?"

"Two."

"Can you find them?"

"Yes, sir."

"Okay, I'll come with you. Wait until I tell my people to wait here for me."

Sgt. Mons appeared at his side.

"Hold them here, Mons," he whispered. "The stream's dead ahead. I'll have the guide contact the two men posted up on the far bank so that we won't cause a rumpus and maybe a shooting between our own people."

"Right, sir."

Feeling his way behind the guide, Lt. Adams moved up to the stream. They crossed quietly through the shallow water and stood on the other bank. They moved forward a few yards and suddenly were confronted at rifle's length by a shadow on the ground, which challenged them. A business-like—and hushed—exchange followed and the lieutenant quickly found himself whispering to two prone figures that his men would soon be moving across the stream and getting into position.

It was with an air of relief that he went back to his men. He found them whispered a few instructions, and then stood and watched as the files passed, split, and disappeared in the direction of the stream. When the head of the Weapons Squad showed up in the night, he swung in ahead of these men, moved back to the stream and crossed it once more.

He almost stumbled on the first prone figures lying on the ground. He moved along the line, surprised that they had gotten into place so quickly.

On the left flank he found the 3d Squad in contact with the 2d Platoon and was told the 2d Platoon was up and already spread out along the line of deployment. As he slipped back along the line toward the right flank, he found everyone ready and waiting. Much training in night work was paying off.

Arriving at the right flank, he checked on the men who were to fire the flares in the 1st Squad. Their flares stacked neatly beside them on the ground, the two grenadiers were ready for their part in the hot minutes or seconds that lay ahead.

Satisfied that all of his men were prepared and ready, Lt. Adams sank to the ground and waited.

The warning whistle of shells approaching from the rear sounded, a rush and roar overhead and a sudden plunge of steel on top of Hill 103. Suddenly beautiful white mushrooms of light and smoke leaped up.

Lt. Adams found himself moving forward. He saw men moving forward silently in front of him.

Five yards passed without a sound. Ten. Fifteen. Then, over in front of the 2d Platoon, an enemy up on the hill gave a startled shout. A rifle cracked. Then two. A ragged volley sounded.

Suddenly the whole line of Company E blazed into action. Lt. Adams saw the flashes of weapons and was amazed that the line was so straight and that it moved forward so swiftly and that the assault fire was so heavy. He turned on his radio.

Flares began to burst over and beyond the Aggressor positions. Lt. Adams pushed past enemy foxholes on to the top of the hill. House *A* lay off to his left and then was past. He began yelling to the line of men not to go too far, to stop, to start pitching dirt.

Some men heard him. They stopped. Others pushed on, to be in their turn stopped by the shouts of their squad leaders or other men behind them.

Flares stopped bursting. Those already swinging down on slow chutes began to burn out. The brilliant light died fast. Quite suddenly it was dark again. The firing died down, ceased, broke out for a few shots, then stopped again. Now one rifle cracked in the night.

He could hear his men taking up positions. He found the runner at his side breathing deeply and discovered that his own lungs were gasping for air. Sgt. Brown found him and reported that his squad was intact and in position.

"Nobody hit, sir," he was saying.

"Fine, fine."

He remembered the red star cluster—signal that his platoon had captured its part of the objective—and had the messenger fire it.

He found Sgt. Mons and the 1st Squad in position and the squad leader talking to the light machine gun team as it went in position. Mons reported one man missing and one hit in the arm. His men had plenty of ammunition. The lieutenant swung over to his left, House *A*, and the 3d Squad. He found them in position, with two men still missing.

His radio crackled and he heard someone talking over it.

Then he realized that the attack was over. The 2d Platoon was reporting to the company commander that it was on its part of the company objective. The 1st Platoon came on the air next, croaking a hoarse message of success and eight prisoners taken.

He pressed down the lever of his own radio and reported. "Easy Six, this is Easy Three. Objective taken . . ."

TERMS USED IN THIS ARTICLE YOU MAY WANT TO LEARN MORE ABOUT

Warning order—To allow their men as much time as possible to get ready for expected future actions, leaders give preliminary notice of an order or action that is expected to follow but for which full details as to execution have not been received.

Operation sketch—A hasty drawing of an area is known as an operation sketch; in this article, it was one prepared by platoon headquarters to show the platoon zone of action and adjacent areas.

Terrain orientation—Before issuing his order, Lt. Adams, a wise leader, made certain that his squad leaders were familiar with the ground over which they would attack. He was careful to point out *on the ground* important terrain features and to tie them in with his sketch of the area.

Point of departure—This is the point on the ground at which the platoon in column crossed the company line of departure at the hour set for the attack to begin. At the same moment that the platoon crossed its point of departure, all the other assault platoons taking part in this attack were crossing their points (or lines) of departure, resulting in a coordinated, concentrated effort by the whole assault echelon.

Squad release point—In a night attack, a point on the ground is selected where the platoon leader releases control of the squads to his squad leaders, who then "peel" their squads off and move to their proper position in the assault formation at the line of deployment.

Line of deployment—For a night attack, a clearly defined terrain feature, usually 100-200 yards from the enemy positions, is selected for the final deployment of the platoon for the assault.

Assault fire—This is the heavy volume of small arms fire delivered by assault troops as they close with the enemy. It is most effective when it *is surprise fire opened at the closest possible* point to the enemy. It is intended to smother opposition.

Limit of advance—To keep control of his platoon and to prevent the assault troops from advancing into the area of planned protective fires for the reorganization on the objective, the company commander named an easily recognized terrain feature as a line that his troops were not to advance beyond.

Protective fires—These are the prearranged fires that could be delivered by supporting artillery and mortars to help break up an enemy counter-attack during reorganization on the objective.

Night identification—The soldier who has a quick means of identifying friend from foe holds a great advantage over the enemy at close quarters in the dark. Besides the luminous tape and armbands mentioned in the article, noises or words (such as challenge and password) are a means for quick identification.

Challenge and password—This is the procedure by which one soldier identifies himself and requests the identity of an unknown person. He does this by giving a *challenge*, usually a word or phrase; the challenged person identifies himself by answering with the *password*, usually a second word or phrase that completes the meaning of the original challenge.

Carrying party—This is a detail of men who hand-carry ammunition, food, and other supplies forward to areas that cannot be reached by vehicle.

Regimental Officers' School

By Col Strode Newman, Infantry

Editor's Note: Via that efficient Army communication system the grapevine — the QUARTERLY learned of the Officers' School, originated by Col Newman and now being conducted in his 511th Airborne Infantry Regiment of the 11th Airborne Division, at Fort Campbell, Kentucky. A note to Col Newman elicited this article on his school, the soundness of which has been confirmed by field test.

This officers' school was no sudden idea but is one of the things I had planned for many years — for implementation if and when I became a regimental commander. The school became a reality in August 1950, and has received the command support of two successive division commanders.

My basic idea was and is that the Army has spent most of its effort toward the daily training of its enlisted men, and neglected the daily training of its officers — which seemed especially unfortunate when so many relatively inexperienced officers so badly need training themselves in order to more efficiently command and train those who serve under them.

The basic plan and principles for the operation of the school can be summarized as follows:

Mission: To train and develop the best possible group of officers as the foundation on which to build the finest battle-ready regiment in the Army.

General: The Army has long provided schooling for officers in the form of courses at various service schools, but this requires the absence of officers from their troops for extended periods of time. The daily Regimental Officers' School is designed to instruct officers in subjects of practical application in their current work. Also included are subjects to prepare officers for advanced responsibilities, and to broaden the professional background of the individual officers. The time lost from regular duties will be

compensated for, many times over, by increased efficiency as a direct result of increased professional knowledge and ability.

Program: Subjects as a whole fall into three general classifications (1) Practical subjects, where students observe actual demonstrations of technique. (2) Theoretical subjects, where students must think. (3) Informational subjects where they are informed of events, past and present. In scheduling these three kinds of subjects every effort is made to vary, from day to day, the type of subject to avoid monotony.

Scope: The breadth of the instruction is best determined by looking at the list of subjects planned for the school. (See the Appendix at the end of this article.) This list is under constant study by several of my senior officers so that timely additions may be made to meet any current needs. It has been found most important also to write a clear summary of the scope desired for each subject to keep the instructors on the beam.

Classes are held for at least one hour and sometimes two hour periods, five days each week. Basically it is intended that the school be more than just a class room: It is intended as the Regimental Officers' Center, where officers assemble for professional purposes only.

Operation: The facts of our daily military life force our acceptance at the outset that all officers will not attend every class, as there are frequent occasions when there is something pressing for individual officers to do. This parallels attendance at drill by enlisted men — where 100% attendance is not expected, but should be approached as nearly as practicable. However, at least two-thirds of those present for duty should attend any one class. . . . and a record of the attendance is kept so that if any officer seems to be missing more classes than appears necessary, this can be looked into by his immediate superior.

One of the foundations on which the school is built is that attendance will save the officer work in the long run, and that he will find himself behind his fellows professionally if he does not attend regularly. This brings out one of

the things which has been a stumbling block: Some instructors tend to include inconsequential details or technical trivia in the instructional material they prepare — while the aim should be to present an understanding, a picture of the idea, rather than to spiel off minutiae which officers are not normally required to know.

For example: In a class on motors the stress should be on how to run inspections, how to organize motor pools, and in general how to exercise command supervision of motors — the theory of internal combustion engines or similar technical theorizing would be a waste of the average officer's time.

Of course it is necessary to publish a school memorandum directing how the school will be run. This should include such things as: Designation of instructors, appointment of a school secretary, lesson plan requirements, make-up classes in important subjects, school files, publication of schedules. . . . and this brings us to a vital point: At what hour or hours each day should the school be held?

After considerable experimentation I finally decided that the class should begin one hour and a half before recall in the afternoon. If recall is at 1700, the class should begin at 1530. In this way there is half an hour of duty time after the conclusion of the school, which allows time for: Individual officers to remain after class for followup discussions with instructors, to talk over the hour informally with other officers. . . or to return to their place of duty and wind up official matters that cannot wait for the morrow. Obviously, two-hour classes begin at 1430.

The actual presentation of instruction follows accepted standards of our service schools, to include: Adequate visual aids, rehearsal of instruction, preparation of handouts to the extent feasible, use of demonstrations and practical exhibits so far as practicable. . . . and the definite requirement that every hour be based on a written lesson plan. The instructional burden is not heavy where all officers are instructors. If there are 115 officers in the regiment, and instruction is given five days a week — then each officer will present a subject on the average of once every five months.

Physical Plant: It is considered mandatory that a school room be provided whose primary purpose is to house the officers' school. This will vary with the facilities available, but to show how one school can be organized I will describe the one we use and how it operates.

A mess hall-type frame building was available near regimental headquarters, which was also within reasonable walking distance from all orderly rooms and offices in the regiment. This was a standard building — dining room, kitchen, and pantry. . . . and nothing else. No funds were available to remodel or fix it up; however, Post did remove the sink, stoves, and refrigerator — but left all plumbing connections so that the building could be easily reconverted.

We use the dining room as the main school room, with a small raised platform or stage at the end away from the kitchen. (See Figure 1.)

Figure 1. The dining room — now transformed into the school room. Color scheme of the room is two tones of green, with all curtains dyed a solid maroon. Note the instructor's platform with draw curtains and a podium.

The kitchen is used as a professional reference library, a study room for instructors, and a drafting room for visual aids. (See Figure 2.)

The pantry section is used as an office for the school secretary, and location of the school files and TI&E files. (Yes, we keep copies of each hour of instruction given, to facilitate a repeat class — and also to enable officers to read up on any hour of the school they missed.)

Figure 2. One corner of the kitchen - now being developed as a reference library and professional study.

The Officers' Bulletin Board and mail boxes are placed in the dining room near the serving line. This has proved a convenient arrangement. (See Figure 3.)

There is a phone in the building, which is an important item of equipment.

By using salvaged celotex and other types of wall board we were able to finish the inside of the building quite satisfactorily, with the exception of the cement floor in the kitchen. . . . and we have not given up on that yet. The

Figure 3. One of four banks of mail boxes, in rear of the main classroom, where officers obtain their mail. This is considered a desirable part of the schooling, facilitating and encouraging informal contact between the officers of the regiment..

small stage built at one end of the dining room was made of salvaged materials — the curtains and drapes are dyed target cloth. The Post Engineer gave us cold water paint, and a limited amount of oil paint. . . . while various odds and ends of minor construction materials were managed somehow by the officer-in-charge of fixing up the school. No appreciable cost was involved in the construction of our school, but a lot of labor and thinking and planning went into it.

For any unit or post commander who may consider establishing such a school, the best advice I can offer is this: Give much thought to what officer you will charge with the construction, and if you get the right man he will end up with a better school building than you had in mind.

We are still improving our school. One problem is to build up our library and reference matter. A number of officers have volunteered books, professional magazines, and other material. There is a great deal of fine professional reading that is normally stored away in headquarters files where the average officer never sees it — but we are making this available in our library.

Of course one of our main aims is to build up as much data as possible on Airborne — and it will be available to all officers, on call, to be signed out to them as from any other library.

What personnel does it take to run the school?

I have one lieutenant, the secretary of the Officers' School, who works under the general supervision of the regimental executive officer. As an additional duty he insures that the officers' TI&E hour is given weekly, *before* the enlisted TI&E hour and *on the same subject*. He also supervises the OFFICERS' CALL program, which is naturally conducted in our Officers' School.

There are two enlisted men. One is a typist and file clerk, the other is a draftsman. Those two men are available to instructors for any typing or mimeographing required, and assist in preparing visual aids. They are also mail orderlies for the officers' mail, keep the Officers' Bulletin Board posted, and conduct the paper work incident to the professional library.

If and when we go into the field or into combat, the school secretary is a trained staff officer for regimental headquarters — and the extra typist and draftsman are available for the staff sections as replacements.

Summary: The Officers' School in the 511th Airborne Infantry presents nothing new and startling in the instructional material it gives the classes — but a daily "drill" for officers is new, and is practicable. There are obstacles

to overcome, even occasions when scheduled instruction has to be canceled or postponed—and every officer does not attend all instruction given — but over a period of time each officer gains much, and thus we have a better regiment.

APPENDIX

PROGRAM OF INSTRUCTION, REGIMENTAL OFFICERS' SCHOOL

Notes: In the subjects listed below, the following apply in some degree to many of them:

(1) Some subjects require more than one period.

(2) Airborne technique will be included as an integral part of all instructions.

(3) Supplementary subjects will be added as experience indicates the need for them.

LIST OF SUBJECTS

Functions of Command
Leadership as Affected by Human Relations
Organization of Thought and Work
Your Obligation to Your Soldier
Personal Conduct of Officers
Methods of Instruction
Military Courtesy and Customs of the Service
Professional Education
History and Customs of Airborne
Major Airborne Operations of World War II
Routine Company Administration
Property Responsibility and Accountability
Reports of Survey, Initiation, and Investigation
Conduct of Boards of Officers
Administration of Unit Funds
Pay and Allowances
Mess Administration
Efficiency Reports
Decorations, Awards, and Commendations
Conduct of Inspections
Voice and Command
Aggressor Organization and Tactics
Preparation and Conduct of Field Exercises

Squad Tactics
Field Expedients
Platoon Tactics
Infantry Platoon in Combat, Historical Examples
Partisan (Guerrilla) Warfare
Road Marches, Foot
Air Transportability #1
Bivouacs
Mortar and Artillery Fire Adjustment and Support
Infantry Weapons and Their Capabilities
Company Tactics
Rifle Company in Combat, Historical Example
Road Marches, Motorized
Tank-Infantry Tactics
Organization, Airborne Division
Air Transportability #2
Close Air Support
Infantry Battalion Tactics
Infantry Battalion in Combat, Historical Example
Radiological Defense
Organization and Capabilities of the Tank Battalion (M)
Organization of the Infantry Division
Organization of the Armored Division
Organization and Capabilities of the Engineer Battalion (C)
Organization of Capabilities of the AAA AW Battalion (SM & SP)
Organization and Capabilities of the Transportation Truck Battalion
Air Transportability #3
Organization and Capabilities of the Chemical Mortar Battalion
Infantry Regiment Tactics
The Infantry Regiment in Combat, Historical Example
Amphibious Operations
Infantry Communication
Motor Maintenance
Troop Information Program
Troop Information Discussion Technique
Psychological Warfare

Conduct of Investigations
Disciplinary Powers of Commanders
Counterfire
Combat Intelligence
Terrain Appreciation
Military Policy of the United States
Medical Support
Engineer Support
Jumpmaster Technique
Airborne Supply
Pathfinder Technique
Ground Assembly Technique after Drop
Training Tests
Current Affairs Having Direct Bearing on Military Activities

Promised for this issue but delayed in production, *Wooden Working Models—The Carbine and Pistol* will appear in the July *Quarterly*. This is another in a series of articles on small arms working models authored by Capt Frederick H. Black, Jr., and Sfc Coats Brown.

Naktong Defense

(Condensed from an account by
Lt Col James W. Edwards, Infantry)

The defense along the Naktong River from 31 August to 16 September 1950 saw some of the most savage and bloody fighting of the war in Korea. This article tells the story of one battalion's part in a four-division defense that destroyed 15 North Korean Divisions thrown against the greatly extended UN front.

This battalion—the 2d Battalion of the 23d Infantry, 2d Infantry Division—fought throughout the period with both flanks open against numerically superior Red forces. After exterminating about two-thirds of the first division thrown against it, the battered battalion met and destroyed about 85 percent of a fresh division sent to knock it out.

The 2d Division occupied a sector along the Naktong River near Changnyong that was 45 miles wide. The 23d Infantry's part of that front was 18,000 yards wide. To start with, the 1st Battalion held the whole regimental front because the 2d Battalion was in division reserve and the 3d Battalion was attached to the 1st Cavalry Division.

The 1st Battalion had all three of its rifle companies abreast, and each company had its three platoons abreast. Each platoon occupied a sector about 2,000 yards wide.*

After dark on 31 August the Reds threw four divisions, reinforced by a tank brigade and a 120-mm mortar regiment, against the 2d Division front. They forded the river during the inky night in multiple columns and cut off or overran the widely separated platoons. Company B was soon isolated and most of Company C was cut to ribbons. The soldiers on this thin line were outnumbered by about 20 to 1.

*In defense of a wide front, "Emphasis is placed on the organization and occupation of key terrain features by strong, balanced, self-sustained units disposed throughout the battle position."—FM 7-20.

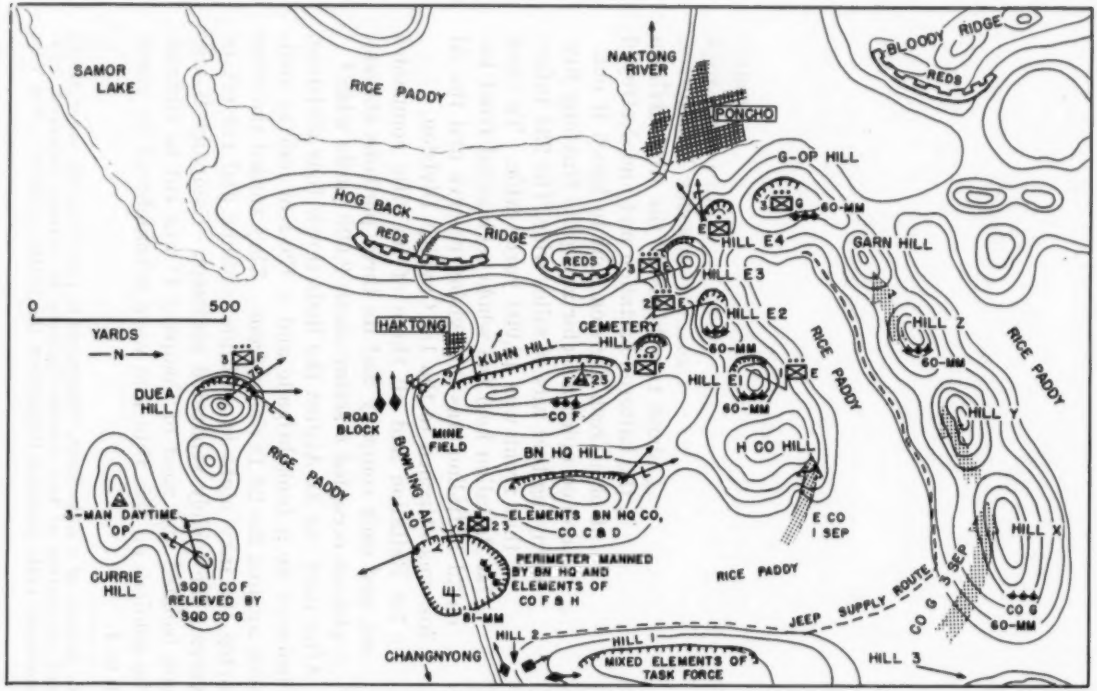

Figure 1. Naktong Defense, 1-3 September

The 2d Battalion, minus Company E (attached to an adjacent regiment as reserve), was then returned to regimental control. The regimental commander ordered one company sent to assist the 1st Battalion and a reinforced company sent to block the Changnyong-Poncho Road. Although this road was in the 9th Infantry sector, the CO of the 23d Infantry felt it necessary to block it to protect his left flank. The 9th Regiment had been hit hard and could not provide protection on this extreme flank.

Company G, reinforced, was sent to the aid of the 1st Battalion. Companies F and H, reinforced, were sent under command of the battalion executive oficer to block the Changnyong-Poncho Road. This small task force moved out with Company F in a motorized advance guard formation. Arriving just east of Hog Back Ridge (see Figure 1) the battalion "exec" halted the force while he made a quick reconnaissance in the dark. Recognizing that the area was well suited for defensive operations, he deployed his force.*

Company F went into position with two platoons abreast, one on Kuhn Hill and one on Duea Hill to the south. Both platoons were reinforced by a section of heavy machine guns. The 75-mm rifle section straddled the road to form a roadblock. The 81-mm mortar platoon set up behind Battalion Headquarters Hill. The task force CP was located in a culvert on the road, and the remainder of Companies F and H deployed around it.

The task force grew during the night. Two M-19's (self-propelled quadruple-mount .50 caliber antiaircraft machine guns), which had been attached to the 9th Infantry, and three tanks of the 23d Infantry Tank Company, which had been attached to Company C, came into the position. Fifteen men from Company C also came in. These men and vehicles had been cut off from their parent units and surrounded, but had fought their way out.

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*Good defensive terrain is characterized by the degree in which the following factors can be used by the defender and denied to the attacker: Critical terrain features, avenues of approach, obstacles, observation and fields of fire, and concealment and cover.—FM 7-20.

At dawn the task force commander rearranged his dispositions. He sent a squad from Company F's support platoon, reinforced with a light machine gun, south to Currie Hill. He sent another squad with one tank east to Hill 2 to protect the rear. An intelligence squad, part of the force's original strength, was reinforced with a light machine gun and sent to Hill 1.

He sent one of the tanks and one M-19 to replace the 75-mm section at the roadblock. The 75-mm section, in turn, he attached to the Company F platoon on Duea Hill. He located the other tank and M-19 near Hill 1 as flank protection for the intelligence squad. He placed the remainder of Company F's support platoon, the 15 Company C men, and 3 Company D men on Battalion Headquarters Hill.*

About 0730 hours, 1 September, a column of 30 Red Infantrymen came trotting down to the road from Hog Back toward Kuhn Hill. Evidently unaware of the position that had been built up during the night, they jogged to within 50 yards of it before the Company F platoon cut loose with their rifles and machine guns. Thirty dead Koreans lay on the road. This was the enemy's first contact with the strong point that was to become known as the Changnyong Bulge.

Two more tanks from battered and isolated Company C on the right joined the task force about 1330. One of them was sent to join the tank on Hill 2 and the other replaced the M-19 at the roadblock near Kuhn Hill.** The M-19 withdrew to the vicinity of Hill 1.

In the early afternoon small enemy groups were observed beyond rifle range moving around both flanks. One group of about 15 men, commanded by an officer, appeared on Hill 3 and were killed or driven off by fire from the intelligence squad on Hill 1. Company F reported enemy build-up on Hog Back and Hill E-3 and E-2.

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*Front-line rifle companies occupy key terrain features and tactical localities within the assigned defensive area. They are located to be mutually supporting and are capable of all around defense, giving close protection to all supporting weapons within their area.—FM 7-20.

**Tanks attached to the infantry battalion reinforce the fires of the main line of resistance, extend the depth of the battalion antitank defense, and participate in counterattacks.—FM 7-20.

Fearing envelopment by these infiltrating groups, the task force commander (the battalion executive officer) sent an urgent call for reinforcements to the 2d Battalion and the Regimental CO. His request was granted. Company E (which had been attached to an adjacent regiment as reserve) arrived. The battalion commander came with it. Upon his arrival, the task force ceased to exist as such, and began to operate as a battalion.

To clear his flanks, the battalion commander immediately ordered Company E to attack and seize a string of four hills to the north known as Company H, E-1, E-2, and E-3 hills (see Figure 7). They were to be taken in the order named. The first three fell to the assault platoon, but neither that platoon nor the support platoon could take E-3 because of heavy enemy fire from surrounding hills and ridges. The battalion commander then ordered Company E to hold the three hills it had taken.

The enemy on Hill E-3 fired two green flares toward Hill E-2 at 2055 hours. This was the battalion's first sight of a dreaded attack signal it later came to know so well. At 2100 hours a reinforced company (about 150 to 200 men) hit the 2d Platoon on Hill E-2.

The Reds, crawling through the brush on their bellies, tried to get within hand-grenade distance before they were discovered. Then the first wave sprang up yelling "Manzai!" as they rushed the position. When one wave was mowed down, another took its place.

The men of Company E matched the Red's fanaticism with their own cold courage. They cut down wave after wave of Red attackers, and finally engaged them with grenades, bayonets, knives—and fists—before being pushed off the top of the hill by sheer weight of numbers. They held doggedly to the reverse slope until 2230 when the attack slowed and then stopped.

Meanwhile, Company F repulsed several small patrols, as did the intelligence squad and tank on Hill 1, and the Company F group on Hill 2. This kind of infiltration kept the entire battalion on an all-night alert.

2 September

At 0900 hours the enemy started to place heavy mortar fire (82-mm and 120-mm) around the battalion CP, located in the culvert. Casualties in Company H and the portion of Company F around the CP were heavy throughout the morning.

Upon arrival of the remainder of the battalion staff and headquarters company, the battalion commander decided to leave most of them and the vehicles at a village about 2,000 yards behind the front line. The communication platoon and headquarters personnel necessary to run the CP remained at the culvert. The Company F squad on Hill 2, relieved by elements of Headquarters Company, rejoined Company F.

The enemy had self-propelled guns on high ground west of Poncho with observation all the way to Changnyong. These guns could fire down the road in the center of the valley. Vehicles on the road were as wide open as ten pins. The valley became known as the Bowling Alley, a name quickly picked up and widely publicized by newspaper correspondents.

With enemy strength building up to the front and flanks, the battalion commander requested an air strike on Hog Back, Hill E-3, Hill G-OP, and Bloody Ridge. At 1220, four P-51's arrived and, after a close call in getting them on the enemy instead of friendly lines, bombed and strafed the four hills with good results.

Company E, on battalion order, took advantage of the strike by attacking the crest of Hill E-2 again. They encountered only a few snipers and many enemy dead. Company E was then ordered to attack Hill E-3. Company F was to support the attack by fire.

The 3d Platoon of Company E reached the forward slope without much trouble, but discovered later that the enemy was dug in on the reverse slope. Reds on Hill G-OP, Garn Hill and Hog Back, having recovered from the shock of the air strike, opened up with mortar and automatic weapons fire, pinning the 3d Platoon to the ground. The Reds on the reverse slope then crawled near the crest

and threw grenades over. Casualties in the platoon being excessive, the company commander ordered the platoon back to Hill E-2. Since both the 2d and 3d Platoons had lost 60 percent of their strength, the company commander decided to leave them both to defend Hill E-2. The 1st Platoon was moved up to occupy Hill E-1 and the 60-mm mortars were moved up behind them.

Back on Kuhn Hill the Reds had launched a heavy attack against Company F's left flank at 1240 hours, immediately after the air strike had ended. The force, an estimated rifle company, ran into final protective fires from mortars and howitzers and suffered heavy casualties. Driving ahead in spite of the losses, the Reds were mowed down by small arms fire from Kuhn Hill and enfilading machine gun fire from Duea Hill. At 1440 they broke and ran, leaving 95 dead behind.*

Shortly after that, eight Red soldiers approached the right flank of Kuhn Hill waving white flags. A squad was sent down to bring them in.

As the squad neared, the Reds dropped their white flags and started to throw hand grenades. The patrol and overwatching machine guns on the hill opened fire and killed all eight of them.

Informed at 1640 that another air strike would be made, the battalion 81's marked Hill G-OP, Bloody Ridge, and Hog Back with white phosphorus shells. The enemy sprang out of their foxholes, making excellent targets for rifles and machine guns. The same thing happened later in the afternoon when the Company F commander called for artillery concentrations on Hog Back. The frightened Reds gave the riflemen a full afternoon of target practice.

The battalion was once again kept on the alert through the early part of the night by enemy mortar fire (always more accurate than their rifle fire) and single snipers who infiltrated into all company areas from Cemetery Hill. By midnight most of the wires to companies and to the artillery and mortar observers had been cut, even though two lines had been laid to each installation.

*The success of a defense is determined to a large measure by the degree of coordination of the fires available to the defending force. —FM 7-20.

3 September

Midnight to dawn was a busy and savage period. At 0150 a reinforced company hit the 2d Platoon of Company E on the left of Hill E-2; another reinforced company attacked Kuhn Hill; and a third company attempted an assault on Duea Hill. Final protective fires took care of the first two assaults, while flanking fire from the .50 caliber machine guns on the tanks at the roadblock and from a light machine gun and a few riflemen who had been moved forward to protect the tanks, took care of the third.

The dreaded green flares signaled another attack at 0400, an assault down the road from Haktong by a rifle company reinforced by three self-propelled guns. A 2½-ton Russian truck leading the SP's hit a mine field that had been laid forward of Kuhn Hill. Company F's 1st Platoon opened up with small arms fire and the new 3.5-inch rocket launchers. One self-propelled gun was destroyed, another damaged, and the third pulled out with the retreating riflemen.

Enemy activity in and around Currie and Duea Hills throughout the night, added to the fact that enemy mortar and self-propelled fire down the Bowling Alley had ceased, gave a strong indication of enemy infiltration and build-up for an assault. The night was very dark, and a light rain of the early evening had become a heavy downpour.

A perimeter defense had been thrown around the battalion CP. It was manned by men from Headquarters Company, Companies F and H, drivers, members of the battalion staff, and the 81-mm Mortar Platoon. The mortars were ordered to cease fire during the night because they left a red trail in the sky every time they fired, and the infiltrators, having located them, were trying to knock them out. The tanks on the road block south of Kuhn Hill continued to fire interlocking bands of fire with the tank near Hill 1. This fire crossed the paddy and met in the valley in front of Currie Hill.

The benefit of this fire was reaped after dawn. A patrol from the battalion perimeter, sent out into the rice paddy to count enemy dead, captured three prisoners. Meanwhile,

unsuspected by anyone, a large group of Reds that had been pinned down by the fire got up from the paddy and surrendered. Seventy-three prisoners were taken in this group, an event that helped bolster battalion morale.

Company G, which had been with the 1st Battalion, rejoined the 2d Battalion at 1015 and moved out immediately on an attack that constituted the feature action for the rest of the day. The company commander was ordered to march his company to Hill X, attack down the ridge line and seize Hills Y and Z and Garn Hill.

By 1140 the company had secured Hills Y and Z without much opposition (see Figure 1). Then, small enemy groups on Garn Hill started to fire at the leading platoon, and men of Company E on Hill E-2 could see about 100 Reds digging in on G-OP Hill. The battalion commander, having asked for an air strike, now decided to make a coordinated battalion attack. He planned to have Company G attack immediately after the strike to seize Garn and G-OP Hills, supported by fire from Company E. After Company G had seized G-OP Hill, Company E could attack and, assisted by the fires of Company G and Company F, seize Hills E-3 and E-4.

Four P-51s arrived at 1400 and dropped napalm bombs and fired rockets on G-OP Hill, Hog Back, and Bloody Ridge. Hills E-3 and E-4, being too close to our front lines to bomb, were strafed with .50 caliber machine guns.

Company G followed the air strike immediately with an attack on Garn Hill, preceded by supporting 81-mm mortar fire that "walked up" the hill about 100 yards ahead of them. Company E's 60-mm mortars and machine guns began firing at G-OP and Hill E-4 to pin the enemy down. By 1500 Garn Hill was seized.

A second air strike was made about 1540. Napalm tanks and 500-pound bombs were dropped on Hog Back and Bloody Ridge; Hills E-3 and E-4 were strafed with .50 caliber machine gun fire. The assault platoon of Company G again followed the strike with an immediate assault on G-OP Hill. Again they were "walked-up" the hill by supporting 81-mm mortar fire. Company E again supported

them with mortars and machine guns. Using marching fire, the assault platoon swept over the hill and secured it by 1630.

At 1645 Company E took Hill E-3, supported by fire from Company G from its newly won hill. Finding that Hill E-4 had been abandoned by the Reds, Company E sent a reinforced squad to this hill to link up with Company G.

As soon as Company E was seen on Hill E-3, about 1735 hours, Company F jumped off in an attack of Cemetery Hill. Company E assisted the attack by fire, according to battalion plan. By 1810, the 3d Platoon, which led the assault, was digging in on Cemetery Hill. The 2d Platoon followed the 3d in the attack and shifted over to the saddle between Cemetery and Kuhn Hills.

By this time on 3 September the battalion flanks were completely exposed. The 9th Infantry on the left had been driven back a good four miles. For the past three days, enemy troops by the hundreds had been streaming by, about 2,000 yards south of the bulge, in pursuit of the 9th Infantry.

On the right flank, the 38th Infantry had been driven almost three miles to the rear, and the Reds were swarming over the hills in front of them.

The 1st Battalion, badly battered in the first Red onslaught, had been forced to withdraw from the area north of the 2d Battalion. About noon of 3 September, the regimental commander informed the 2d Battalion that the 1st Battalion and troops from regimental headquarters would move in on the left of the Changnyong Bulge.

Why the Reds never took full advantage of the 2d Battalion's open flanks could be used as a point of departure for an article on Oriental thought processes. A captured Red field order later revealed that the boundary between the 2d and 9th Red divisions ran just south of the Changnyong Bulge. This explains in part why they didn't come around the 2d Battalion's left (south) flank, but why they didn't come around the right (north) flank is anybody's guess. All captured field orders named Changnyong and the Tae-Pak Mountains, directly east of the town, as ob-

jectives. Attacks toward these objectives always headed down the Poncho-Changnyong Road, straight into the battalion's positions.

4 September - 11 September

The next six days and nights were to tell the final story. Unable to attack profitably during the day, the Reds pounded the battalion positions with self-propelled and mortar fire until night came. Then they came out of hiding to launch their fanatical attacks up the steep slopes.

The battalion—as well as the Reds—usually withdrew from the crests during daylight, manning only OP's and sniper posts. After dark the companies moved over the crests and occupied foxholes on the forward slopes. All positions had all-around perimeters.

On 5 September the 1st Battalion on the left took over a part of Kuhn Hill (see Figure 2), enabling Company F to close in northward over Cemetery Hill and Hill E-2 and tie in with Company E. The new battalion CP was set up behind Company H Hill. Company H mortars and 75-mm rifles moved to the same area, giving the hill its name.

The battalion strengthened its toe-hold on 4 September by grabbing the three low hills on Emerson Ridge and again on 6-7 September by seizing Manzai Hill and Bloody Ridge (see Figure 2).

The Reds were increasingly desperate in their night attacks. Just after midnight on 5 September, they launched an attack all along and around the battalion front. Long range, close defensive, and final protective fires trimmed every attack down to a size that the weary doughboys on the slopes could handle with rifle, grenade, and bayonet.*

During this period the 2d Battalion was fortunate in having an alert and well trained field artillery battalion in support. In one night alone, the 37th FA Battalion fired 2,300 rounds in support of the battalion. A liaison officer accompanied the battalion commander on all trips to forward OP's or other points directing the defense. He had

*Defense in darkness depends upon prearranged fires and close combat.—FM 7-20.

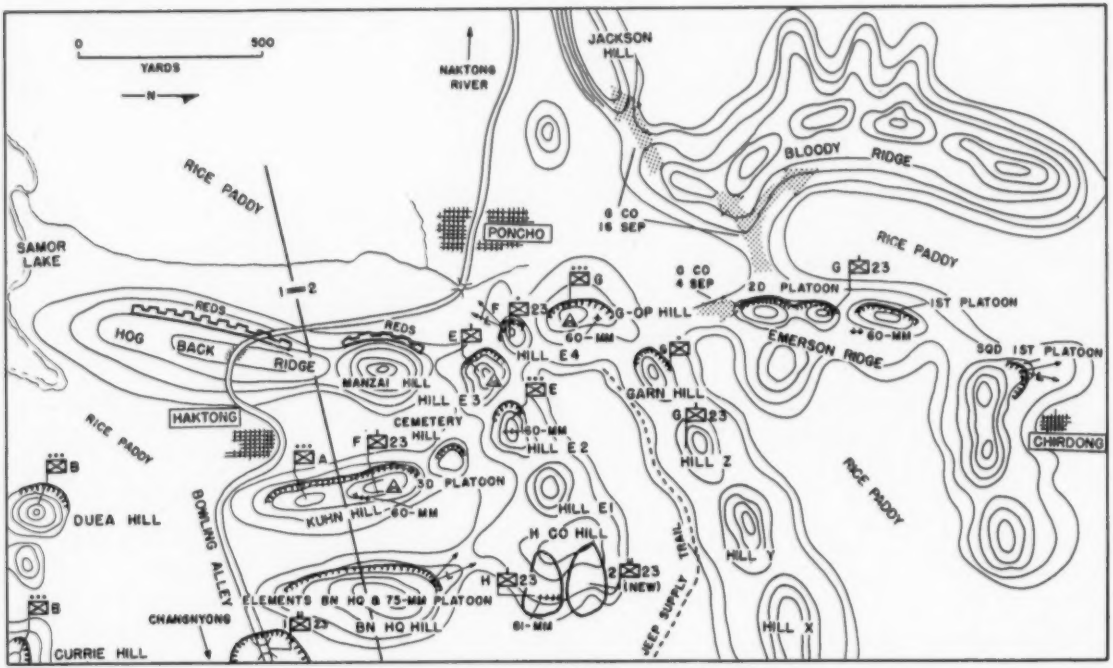

Figure 2. Naktong Defense, 4-16 September

stationed a forward observer with each rifle company. At the close of each day's action the forward observers registered final protective fires in front of each company area. During the first enemy attack on Cemetery Hill, Company E asked for a concentration that the artillery was reluctant to fire because the clearance was in doubt. But so great was the battalion's confidence in the 37th FA Battalion that the FDC was authorized to call for the fire. When fired, it landed on the attacking Red battalion about 50 yards in front of the 3d Platoon on Cemetery Hill.

Enemy mortar fire and counterattacks continued through the nights of 6 and 7 September. On the night of 8 September, unusually heavy enemy fire and the dreaded green flares heralded another all-out attack. Protective fires were brought down all around the battalion, but the Reds came on undaunted. Hand grenades rolled over the steep slopes and took a terrific toll. The battalion, although driven back over the crests of some hill positions, managed to hold on. This attack nearly ruptured the extended, depleted, and battered defense line.

At dawn on 9 September, a Red company attacked Bloody Ridge. Unknown to the enemy, Company G had withdrawn the night before, leaving the ridge mined and booby-trapped. Red artillery smothered the ridge, followed by wave after wave of infantrymen. The shouts of "Manzai!" died in their throats as they mounted the ridge and found no Americans. Then a hail of rifle, machine gun, and 60-mm mortar white phosphorous fire from Emerson Ridge and G-OP Hill hit each wave as it came up. The Reds, silhouetted against the morning sky on the ridge line, were picked off like ducks in a shooting gallery.

Although enemy losses during this period were known to be heavier than our own, it was also known that the 4th Red Infantry Division had crossed the Naktong during the nights of 6-7 and 7-8 September to replace the depleted 2d Red Infantry Division.

11 September through 16 September

Red attacks for the final six days were marked by decreasing punch, persistence, and fierceness, indicating

more clearly every day that the attacks were being made by inferior troops. Prepared artillery and mortar concentrations killed and scatttered them, and their assaults melted away after a taste of final protective light weapons fire.

An indication of their growing weakness came on 12 September when they began to broadcast over a loud speaker to the battalion, asking the Americans to surrender and telling the South Koreans to desert and join the "Glorious Peoples' Army." These simple broadcasts caused more amusement than anything else.

Patrols were sent through the village of Poncho and all along the battalion front on 12 and 14 September. The nights were increasingly quiet, except for the always accurate mortar and self-propelled gun fire.

Battalion morale took a sharp turn upward on 13 September when an announcement of the proposed Inchon landing on 15 September was circulated.

By 15 September the time was ripe for a breakout. The battalion commander received an attack order at regiment for the next day. The 2d Division was to attack with all regiments abreast. The 23d Infantry Regiment would attack in this manner:

The 2d Battalion would secure Bloody Ridge and Jackson Hill (see Figure 2) while the 1st Battalion would attack in its sector on the left. As soon as the 2d Battalion had secured its objectives, the 3d Battalion, which had been less engaged and was almost up to full strength, would pass through the 2d and continue the attack. The 2d would then revert to regimental reserve.

A 15-minute artillery, 4.2-inch, and 81-mm mortar preparation was laid down on Bloody Ridge at 0555 on 16 September. At 0605 Company G's 60-mm mortars joined in the fires. The 2d Platoon of Company G jumped off at 0610 to take Bloody Ridge for the last time (see Figure 2). A few Red snipers there fled and the ridge was secure by 0630. The supporting mortar and artillery fire shifted to Jackson Hill, where a group of Reds were intrenched. The 2d Platoon continued the attack toward Jackson Hill and

the 1st Platoon occupied Bloody Ridge. By 0650 Jackson Hill was covered by men of the 2d Platoon.

The regiment's line of departure was secured. The bloody Naktong defense was ended and the breakout from the Pusan perimeter was on.

SIDELIGHTS

Every military operation, especially one as desperate as the Naktong defense, is marked by thousands of separate activities and sidelights that contribute to a unit's success. The common, every-day heroism and ingenuity of the American soldier is a prime example. The welding of units into a compact fighting team is another. A few such sidelights, picked for their instructional value, are worth mentioning here.

Barbed wire was a critical item throughout the Naktong defense and the most some units got was enough to string a single apron defense. This required the men to make the most of antipersonnel mines, trip flares, and booby traps. One field expedient worked especially well. A hand grenade was inserted into a C-ration can and armed by pulling the safety pin. The can was then tied down and a trip wire attached to the grenade, stretched tight, and fastened at the other end. An enemy, stumbling against the trip wire, pulled the grenade out of the can, allowing the handle to fly off.

Grenades were a favorite weapon with the defenders. A common method of using grenades was to roll them down the steep hills at the attackers, instead of throwing them.

The battalion made limited use of infra-red equipment. Many nights its range was restricted to 30 yards by rain and fog. It was used chiefly as a means of observing at night.

Air strikes were usually handled in this manner: An observation plane would appear before the fighter-bombers. The battalion commander on regimental order would mark each flank of the target with white phosphorous shells from his 81's. Friendly front lines were marked with white panels. The observation plane, after picking up the target marked by the shells, would then lead the fighter-bombers

on a pass over the target. The battalion commander would observe this "dry run" and inform regiment if the planes were on the right target. The planes would then drop napalm, fire rockets, and strafe with .50 caliber machine guns on successive runs over the target.

The Reds used a number of tricks to make an accurate air strike more difficult. Using captured white panels, they marked their own positions as friendly front lines, forcing the battalion to use a different panel code each day. They also fired white phosphorus shells back at our flanks immediately after we had marked theirs, hoping to make our planes hit our lines.

Resupply of critical items by air was accomplished successfully. Smoke producing HC candles were used to mark the battalion drop zone and indicate the wind direction. Most drops were about 90 percent successful.

Men of the battalion used the bayonet very often during the Naktong defense. They never made an assault without first fixing bayonets.

CONCLUSION

The battalion demonstrated that determined infantry, supported by closely coordinated fires from air and artillery, can defend a widely-extended front against vastly superior numbers. It proved that aggressive determined defense of this kind can inflict irreparable damage on the enemy and open the way for a successful counter offensive when the time is ripe.

The *Quarterly* is a clearing house for Infantry ideas and questions. Address your comments or queries on the Infantry to: Editor, *Infantry School Quarterly*, The Infantry School, Fort Benning, Georgia.

The 105-mm Recoilless Rifle

By Maj Lee W. Fritter, Infantry

The newest weapon to be standardized for infantry use is the 105-mm Rifle, M27. It is so new to the infantry family that, as yet, its exact location within the regiment has not been established. It is capable of defeating the armor of any known tank.

The complete rifle, less mount, weighs about 580 pounds and can fire to a range of 8,300 yards, although its direct fire sight is graduated only for ranges up to 2,700 yards.

In adapting the 105-mm rifle to our current needs, expediency dictates that it be mounted on some vehicle or carriage already in use. With relatively minor modifications, the jeep and the weasel are suitable for this purpose. The result in either case is a light self-propelled gun. The total weight placed on the ¼-ton truck including the weapon, ammunition, and personnel is approximately 1500 pounds. This, of course, greatly overloads the vehicle and necessitates the use of reinforced rear springs.

A heavy-duty rear axle also is provided, although perhaps not essential. A jeep mounting the 105-mm rifle, which has been used for test purposes, has been driven more than 1,000 miles over all types of terrain that such a vehicle could normally be expected to negotiate. This particular vehicle has the standard rear axle, yet it has performed satisfactorily with no maintenance problems due to overloading.

Should this modified jeep become immobilized, the rifle, in an emergency and for short periods, could be placed on any ¼-ton truck. The weapon is adapted to the vehicle by use of the 105-mm Rifle Mount, M75, which is easily attached to the rear of the jeep when the back seat is removed. An "A" frame is also mounted just forward of the dashboard to support the gun tube while traveling. (See Figure 1).

While the weasel requires no structural or power reinforcement, its outward appearance is altered considerably. The bow and stern pontons, which make it amphibious, are removed. The top is lifted off and the sides and rear are cut away to prevent damage by the blackblast.

Figure 1. The 105-mm Rifle, M27, mounted on a ¼-ton truck.

Both of these vehicles have certain limitations, one of which is the small quantity of ammunition that can be carried. After the addition of racks, the jeep and weasel carry only four and eight rounds of ammunition respectively. This indicates the necessity for a second vehicle for each gun to serve as a prime mover for an ammunition trailer. A ¼-ton truck and ¼-ton trailer are proposed for this purpose.

A two-wheel towed carriage for this rifle has also been standardized as the carriage M22. This carriage, with

the weapon mounted for firing, weighs about 1,000 pounds and can be quickly disassembled and assembled for air transport.

The mount M75, which is used on the ¼-ton truck, consists of a top and bottom carriage assembly, equilabrator and elevating mechanism assembly, and an adapter. The top and bottom carriage assembly contains the traversing mechanism, including a handwheel for controlled traverse and a traversing clutch handle that permits disengagement of the traversing gears and thus provides free traverse for tracking moving targets. The equilabrator and elevating mechanism assembly connects the barrel to the top carriage. Changes in elevation are made by turning the elevating handwheel while the equilabrators compensate for the muzzle preponderance of the rifle. The adapter is bolted to the jeep body and serves as a rest for the top and bottom carriage assembly.

The mount used on the modified weasel, which has not been standardized, is identical to the mount M75, except for the adapter. When the gun is mounted on the towed carriage, no adapter is required because the top and bottom carriage assembly rests directly on the carriage just above the axle.

To serve the weapon when it is vehicular mounted, a squad organization that has proved satisfactory but not yet approved, is composed of seven men, as follows:

1. Squad Leader
2. Gunner (No. 1)
3. Loader (No. 2)
4. Assistant Loader (No. 3)
5. Ammunition Bearer (No. 4)
6. Driver (Ammunition Vehicle) (No. 5)
7. Driver (Gun Vehicle) (No. 6)

The posts of the crew members during movement and while the weapon is in action are shown in Figure 2. The duties of each crewman when in action are briefly outlined below.

Squad leader. The squad leader, in addition to general supervision of his squad, issues fire commands, and observes

and directs fire. He also unfastens the traveling lock on the A-frame and operates the cross leveling knob on the sight mount.

Gunner (*No. 1*) sights, lays, and fires the rifle. He places the weapon in and out of free traverse when necessary and places the tube in the traveling position in the A-frame.

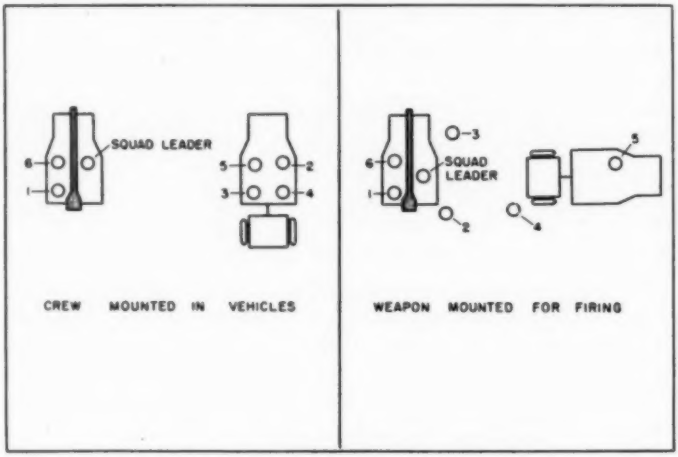

Figure 2. Posts of crew members when the rifle is vehicular mounted.

Loader (*No. 2*), prior to loading the weapon, checks the bore and chamber to see that they are clear. He loads the rifle, obtaining the ammunition either from the ammunition rack on the vehicle or from the assistant loader. He also designates the type of ammunition to be carried from the ammunition trailer to the gun. Before indicating to the gunner that the piece is ready to fire, he checks the danger area in rear of the gun.

Assistant Loader (*No. 3*) prepares the ammunition for loading by removing it from the containers, removing the safety fork, and setting the fuze when necessary.

Ammunition Bearer (*No. 4*) carries the ammunition from the trailer to the post of the assistant loader. When directed, he assists in removing the ammunition from containers.

Driver, Ammunition Vehicle (*No. 5*) moves his vehicle to a defilade position that is free from danger of damage by the backblast. This position should be far enough from the gun so that both the ammunition and weapon vehicles will not be destroyed or damaged by the same enemy shell. The driver stays with his vehicle, helps carry ammunition, or goes to the rear to replenish his ammunition load as directed by the squad leader.

Driver, Gun Vehicle (*No. 6*). The driver of the weapon vehicle remains in the driver's seat during firing. He moves the vehicle as directed by the squad leader. He should anticipate frequent moves as a defense against enemy fire, since the characteristics of the weapon, principally the backblast, make concealment difficult.

This organization, making full use of the capabilities of its weapon and ammunition, can make things uncomfortable for any enemy tank crew.

The quantity of ammunition carried on the gun vehicle, as pointed out earlier, is very small. The limitation is imposed by the weight and bulk of the ammunition. Each of the four types of combat rounds weighs approximately 45 pounds. All types have certain other common characteristics. The ammunition is the fixed type, the perforated cartridge case being crimped to the projectile. These rounds have a pre-engraved rotating band which is characteristic of all recoilless ammunition. There are two "indexing buttons" located diametrically opposite each other on the projectile. These facilitate loading by causing the pre-cut rotating band to engage the rifling in the tube properly when the round is inserted in the chamber.

The four types of combat ammunition are HE; smoke; and two antitank rounds. Except for the pre-engraved rotating band and the "indexing buttons," these shells are similar in appearance and effect to the corresponding projectiles for the 105-mm howitzer.

Since the role of the M27 rifle is primarily defense against armor, the two antitank rounds deserve more detailed consideration.

An important consideration in connection with the two antitank rounds is that each round is a complement to the

other; that is, the limitations of one shell are offset by the capabilities of the other. Selection of the right ammunition for a given condition enables the gun crew to knock out any tank it is likely to encounter. Range is not a critical factor in the effectiveness of either round. The critical factor is *the ability of the gunner to hit his target.*

The minimum danger zone for personnel in the backblast area extends 100 feet to the rear of the gun. Windows and light structures may be damaged as far back as 300 feet.

As its capabilities as an antitank weapon indicate, the M27 is basically a direct fire weapon. The direct fire sight is the Telescope, M90C, which has about three-power magnification. The reticle pattern is fundamentally the conventional "tree type." The identifying characteristics of this type reticle are a broken vertical line in the center, which is the range indicator, and a series of broken horizontal lines, which are the lead indicators. Each vertical line segment and each space between line segments is equivalent to a one hundred yard range change. The range in hundreds of yards is indicated by even numbers placed opposite the broken horizontal lines. Similarly each horizontal line segment and each space between segments is equivalent to one lead, each lead being equal to five mils. The lead lines cross the reticle at range intervals of 200 yards.

The capabilities of this rifle against other types of targets should not be overlooked. Its accuracy and the characteristics of its ammunition make it very effective against point targets, such as gun positions, earth and log bunkers, caves, or grouped personnel. In addition to the direct fire telescope, an indirect fire sight is also provided so that indirect fire becomes a capability. Also, the indirect fire sight may be used for direct fire for ranges greater than 2,700 yards, the maximum graduation on the direct fire sight.

This rifle should go a long way toward fulfilling the requirements in airborne units for an effective anti-tank weapon. Comparatively speaking, it is extremely light and is easily capable of being air transported when mounted on

the ¼-ton truck, modified weasel, or the carriage M22. It could also be parachute dropped.

The 105-mm Rifle, M27, mounted on the jeep or weasel does not represent the end of our quest for a battalion antitank weapon. The vehicles have certain limitations, as previously pointed out, and operational and maintenance problems peculiar to these vehicles are to be expected. The rifle itself has some disadvantages, the main one being that it is too heavy to be hand carried. Another is the absence of a practical ground mount. But for all that, it is a truly formidable infantry weapon. It is accurate and reliable, and it packs a terrific punch. It is a weapon that the crew, and the doughboy it supports, can look upon with confidence. They can fight with the assurance that they have a gun which will defeat any medium tank they might encounter.

Beachhead of the Future

By Maj Edward M. Flanagan, Artillery

Gaze into your blitzed-up crystal ball; get out your dusty old Ouija board; have Madame Lazonga read the tea leaves in the bottom of your cup; or, lacking those devices for piercing the clouded haze blocking a clear view into the future, just *think* about an airborne operation of the latter stages of World War III.

Throw into the hopper of your brain the new developments and new trends in things airborne, and mix it all up with a few views on what the production facilities of this country can turn out when pushed into a national emergency, pushed perhaps by an enemy horde poised behind a line of distant mountains and impassable barriers, or at least barriers difficult of traverse by standard ground units. Then you've got it.

The stage is set for an operation in which units and equipment are transported into an airhead by air; they are reinforced by air; and they are evacuated by air. When the force is built up to the size of a field army, say, or any other size dependent upon the mission, it will burst out of the airhead on to its objectives.

Shades of Buck Rogers in the 25th Century? Not at all. With the planes already developed today, in larger quantities of course, such an operation, conducted deep in the enemy's rear, is a possibility.

The parallel between an amphibious operation and an airborne operation is almost unswerving. The water-borne assault units carve a section out of an enemy held beach, expand it for maneuver room and for acreage for follow-up units, and then break out when the force ashore is big enough to do the job. The amphibious units are initially surrounded on three sides by the enemy. They are transported to LST's and the rest of the family of assault ships,

by the Navy and under command of the Navy. The first men ashore are aggressive, attacking doughboys, supported by light artillery and tanks. It's their job to establish a beachhead line and defend it while the terrain behind them receives the build-up of units and equipment. As the succeeding waves land, the beachhead gets safer and safer, (ideally speaking), the equipment brought in gets heavier and heavier, and headquarters, higher and higher. Then with a rumble of artillery, a whumping of bombs and rockets from the tactical air force, and a roll of naval gunfire, the beachhead line springs to life, moves forward against the enemy, and plunges on to its objective.

Now consider an airhead. You have just about the same thing. Imagine a strategic type airhead, the successful establishment of which will influence the entire theatre, not just a local corps or army front. A strategic airhead, deep behind the enemy lines, in an area of your own choosing, established with speed, daring, and surprise is the ultimate goal.

The assault echelons are the airborne divisions, specially equipped to do the job at hand, seize the airhead. They arrive in LCVP's of the air—the C-119—and like the parallel of the Navy commanding while the ground forces are afloat, so does the Air Force command while the airborne forces are in the air. The airborne force jumps; its equipment, including 105's, ¾-ton trucks, 40-mm AA guns, jeeps and D-4 dozers, 2½-ton trucks and 155 howitzers, jumps with it. (See Figure 1.) It lands, reorganizes, and moves out to its pre-planned, pre-rehearsed initial objectives.

The airborne force knocks out the local opposition, establishes itself around the perimeter of its airhead, and digs in. The force is surrounded on four sides but it has taken advantage of an age old maxim of war—it is fighting on interior lines. And that maxim recognizes the paradoxical fact that there are advantages to being surrounded. Consider the wheel—its tire is obviously larger than its rim. Just so in an airhead—it takes a larger enemy force to surround an airhead than it does to defend the airhead line. The interior lines permit rapid dispatch

of reserves to a threatened point on the perimeter and easy massing of artillery anywhere along the rim. The tactical air support, directed by FAC's (Forward Air Controllers), who have jumped into the airhead with the assault echelons, can be easily concentrated and delivered around the perimeter.

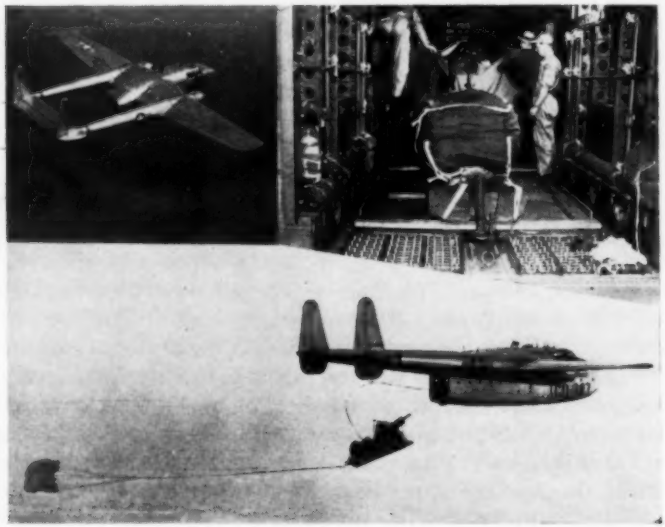

Figure 1. Heavy drop techniques are constantly improving. Here a C-82 drops a standard 105-mm howitzer by parachute.

So far in our strategic airhead we have an airhead line established—manned by the airborne units and backed up by the airborne artillery, engineers, anti-tankers, and some limited service units. In the airhead the airborne units have seized and cleared airfields and aviation engineers have probably started to scrape out some more. (We wouldn't be laying on this kind of an operation if there weren't some airfields around.) They have occupied the dominant terrain features. They've seized enough ground for maneuver space.

The time is at hand to build up and blow up the airhead, until, like a balloon, it bursts. And this is where the stand-

ard infantry divisions come into the airborne operation. They're air-transported in the larger ships of the troop carrier fleet. They'll still use the C-119's, C-54's, and assault cargo aircraft for smaller items of equipment and for personnel, but the heavier equipment of the infantry divisions and the follow-up echelons of the airborne divisions, the flying LST's—the C-124's—are brought in. The C-124 is the new freight car of the skyways—a cargo-hauler capable of flying 50,000 pounds of cargo at a range of 1000 miles. (See Figure 2.)

In the follow-up echelon of the airborne division will come the equipment necessary to sustain the airborne division in extensive combat—the tanks, engineer equipment, and heavier items that cannot be dropped or landed in the assault phase. Again, the C-124, or comparable type aircraft, will carry the load.

With the arrival of the air-transported units and the build-up supplies and equipment, the airhead takes on the atmosphere of a busy beachhead—dumps established, units moving out into assembly areas or into the line if the enemy

And here is where we could use a pod-carrying aircraft like the C-120, a plane that can land, rapidly detach a loaded pod, move over an empty pod, hook it up, and take-off to the departure base for another loaded pod. By use of the C-120, a vast amount of cargo can be delivered in a short time. (See Figure 3.)

After the build up has been accomplished, forces are deployed, the artillery and air support intensify their efforts, the infantry and tanks move out. The assault on the ultimate objective is launched. Supplies continue to arrive by air, evacuation is by air, reinforcements come in by air. The strategic airhead expands like an oil slick on water. Eventually, it flows back to our own lines or our ground forces catch up to the airborne forces. The link up is incidental, however, and not necessary to the success of this type operation.

A prodigious amount of planning and coordination is obviously necessary to mount successfully an operation of this magnitude. The Air Force, Army and probably even

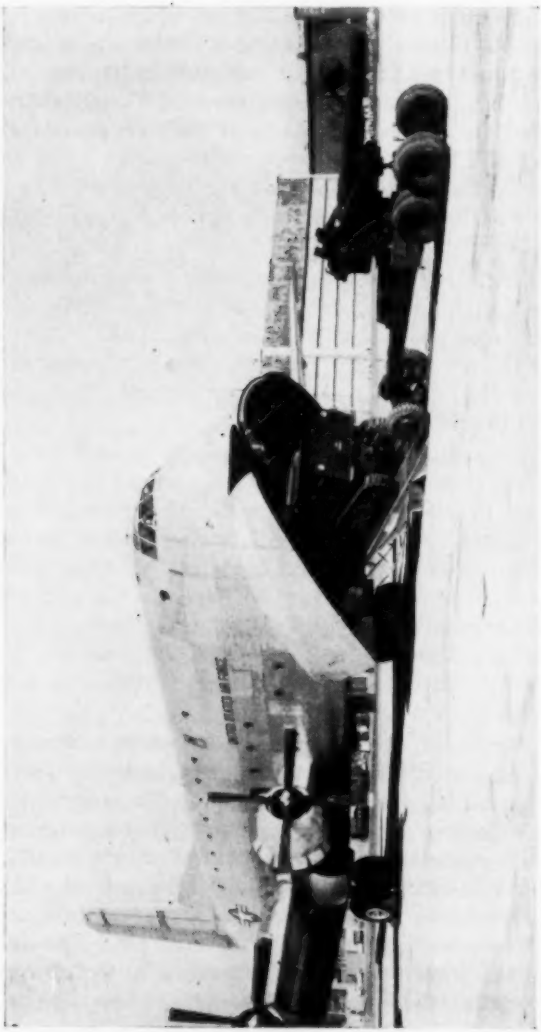

Figure 2. Larger aircraft — heavier loads. This flying LST — the C-124 — can load equipment by ramp into its nose, or by elevator into its belly. It has seating space for 222 men.

the Navy will be involved. For that reason, an airborne operation can be launched only by the headquarters having control of all forces and facilities required—i.e., theatre headquarters or, at the lowest, an Army Group Headquarters.

The location of the airhead itself requires the most detailed study. One of the first things to influence its location is, of course, the objective. The size of the forces to be employed, the availability of the terrain for drop zones

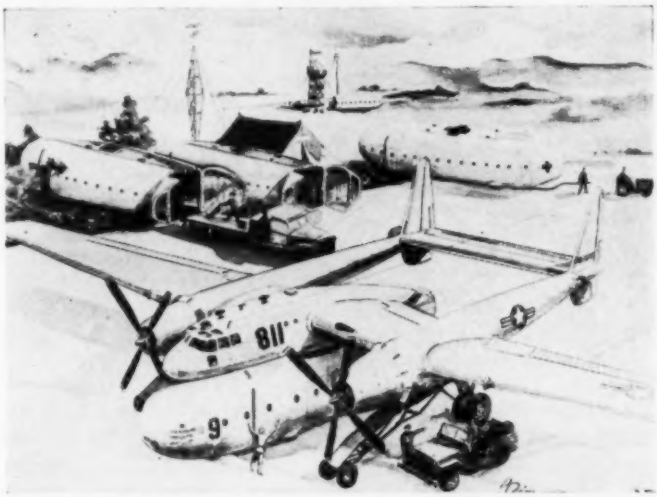

Figure 3. Aircraft designers are increasingly ingenious in conceiving new air transportation equipment. This artist's conception of a C-120 aircraft shows a revolutionary design incorporating a detachable, multi-purpose pod. This type aircraft has been built and has been flown with and without the pod.

and landing zones, the defensibility and offensibility of the terrain, the scheme of ground maneuver and the range of available aircraft are all factors which go into the selection of the airhead.

The development of the airhead from the initial assault to the break-out follows a pattern of shock, speed, and surprise; then build-up of mass and power; and finally the inevitable crunching blow at the heart of the enemy.

Schematically the development of a strategic airhead might look like this: (See Figures 4 through 8.)

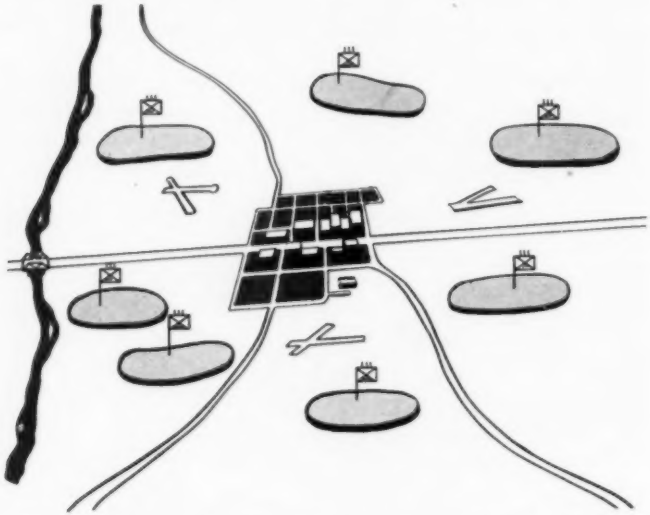

Figure 4. Schematic conception of D-Day landings by airborne divisions in regimental comabt team formations.

An incredible operation? Consider the Berlin airlift and its tonnages delivered by air. Granted that the Berlin airlift operation was on a short range, there was no interference by enemy AA or fighters, and airfields were ideally organized for the task at hand. But there's nothing to prevent the accomplishment of a similar operation under combat conditions once the productive potential of this country has been realized.

It's obvious that vast numbers of fighters will have to protect the corridors to the airhead; tremendous cargo carrying fleets of transport aircraft will have to be marshaled, supplies by the tons, men by the thousands will have to be assembled. The task is similar to moving by air the forces and supplies employed in the Normandy amphibious operation. When we can do that we're ready for the final assault on the enemy that can result in only one thing—victory.

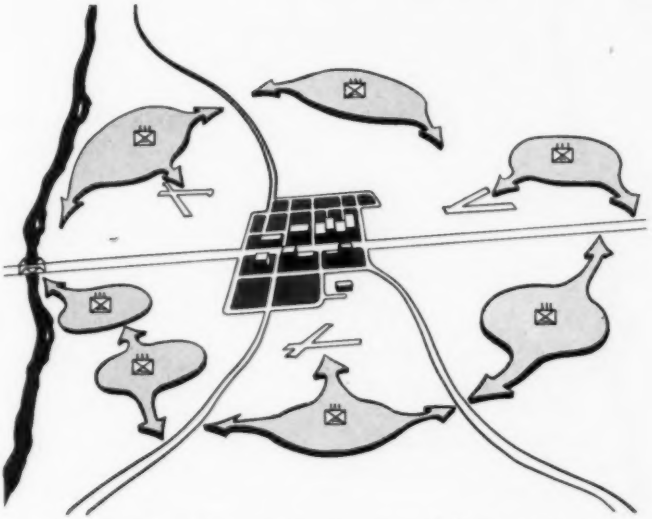

Figure 5. Scheme of maneuver — D-Day and D+1.

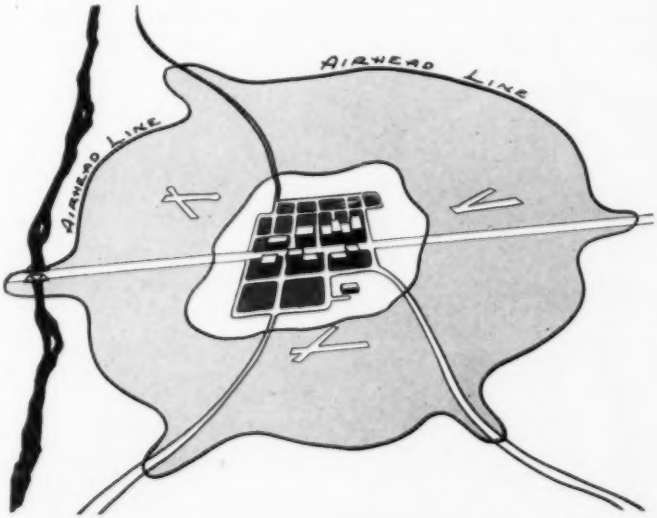

Figure 6. Airborne regimental combat teams link up with each other prior to taking the center of the airhead — D+1 to D+2.

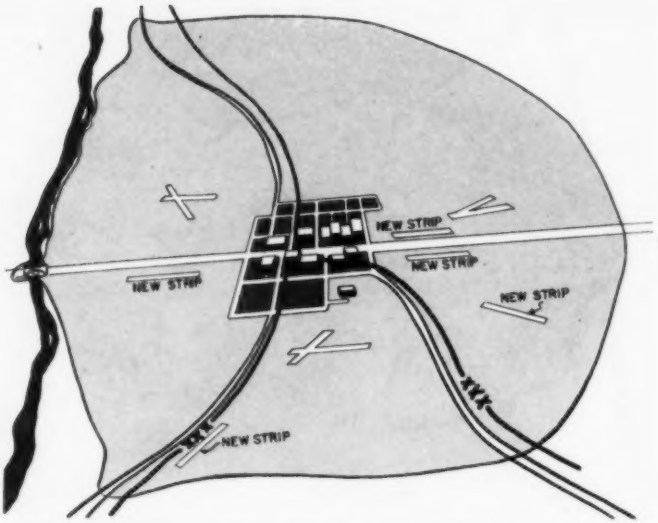

Figure 7. Buildup and expansion of the airhead — D+3 to D+10.

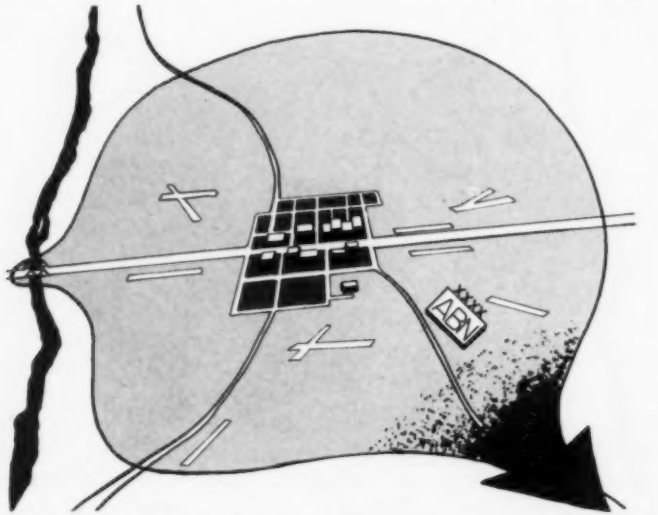

Figure 8. D+11 — the breakout — an airborne army attacks.

But there's a long, hard haul ahead on the road to that goal. Airborne forces, techniques, and doctrines are at the same state of development as was the Air Force at the end of World War I. World War II saw a Goliath—the Air Force—come into its own. Post World War II developments have seen the Air Force spread its already lengthened wings and soar into the realms of the impossible. Whether we agree with Air Force doctrine on matters of their strategic air concept and ground support doctrine or not, we must admit to the growth and power and vision of an Air Force which needs bow to no enemy or evade any mission.

The airborne force does not have to face the same skepticism as confronted the Air Force after World War I. But the airborne force, on the other hand, needs nurturing, expansion, facilities, and joint training with the Air Force if it is to come of age in World War III. It cannot be left to slide on its own. And when we speak of an airborne force we include the air-transported standard ground units which build up the airheads seized by the airborne units. And when we consider that almost any unit in the Army Field Forces is capable of moving by air today in our larger transports, all of us must be airborne minded. The C-124, and its ability to carry huge loads, is gathering all of us and our units into the fold of potential airborne operation participants. The old idea, "it can't be done" must be replaced with the idea that "anything is possible."

How much more advantageous it would have been to assault the continent by air, instead of amphibiously, as we did on D-Day is more conjecture and back-sighting.

But an airborne task force (of strategic size, not the three airborne divisions which were actually used to block the enemy and seize a few vital installations) could have landed in an area of its own choosing, where defenses were light, where the enemy was off balance by the mere threat of an airborne invasion, and at a time when we could pick the most advantageous hour for our attack, independent of tides and other considerations of naval amphibious operations. Wouldn't it have been less costly in men and material to assault the enemy from his weak and lightly defended

rear instead of by the sledge hammer thrust at his front where he had every reason to expect that the blow would fall? No one knows. World War III should give us the answer.

Our ranking officers are aware of the potentialities of the airborne concept. General J. Lawton Collins is an exponent of it. He said: "we in the Army must place increasing emphasis upon transportation by air, and more of our personnel and equipment must be prepared to move by that means.

"For I am convinced that if war ever comes again, airborne operations will play a far more vital part than ever before."

And a directive from Army Field Forces has required that all units in the Army be prepared to move by air. Plenty of importance is being placed on air- mobility from the top.

The Rhine crossing by the U. S. 17th and the British 6th Airborn Divisions saw over 17,000 men and 1,347 glider loads of equipment and personnel delivered in a compact area in 2 hours and 42 minutes. That's mass in World War II terms. But for a strategic airhead type operation, it's small potatoes.

Napoleon and General Nathan Bedford Forrest were in agreement on mass. The former said: "The strength of an army, like the power in mechanics, is estimated by multiplying the mass by the rapidity of movement (or F = MA);" the latter said: "Get there fustest with the mostest."

How better than by airborne assault?

The Penetration as a Form of Maneuver*

By Lt Col James H. Reynolds, Infantry

Have you ever watched a group of kids playing sandlot football? Next time you see them, notice how many times they run the ends compared to going through the center of the line. On practically every play they will try the ends. Why? Well, when they line up for scrimmage, it looks like too much strength in front of them, so they try to run where there appears to be no defense, around one end or the other.

College quarterbacks are guilty of the same reasoning. The ends always appear to be the easiest place to gain ground. I recall a college game in which our quarterback opened the play by using straight line bucks from our own ten yard line to our opponents' ten. Then he got smart, or so he thought, tried an end run that failed, then a pass to the flat. In the opposing backfield was a chap who held the 100 yard dash Middle Atlantic Championship. He picked the ball out of the air in his end zone and went a hundred yards for the score. Under exactly the same conditions he duplicated the same feat in the next half.

Because, at the time the play was called, our opponents had no men physically present in the areas beyond our ends, those areas *appeared* to be a good place to strike. Our quarterback had not reckoned with the possibility that the opposing team could extend a defense toward those flanks just as fast as we could run a play in that direction.

That situation is analogous to many occuring in ground combat. The same conditions exist in many cases when we plan our forms of offensive maneuver. These conditions must be considered when we decide whether to envelop

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*The author expresses his appreciation for advice on the preparation of this article to Col. Henry E. Kelley, Chief of the General Subjects Section, Command and General Staff College, Fort Leavenworth, Kansas.

the enemy's position or penetrate it. FM 100-5, paragraph 392 *b*, points out the conditions that favor a penetration over an envelopment. Substantially this is what it says, "It is better to take advantage of the enemy's extension and consequent weakness by retaining a deep formation, and to penetrate his thinly held front, than to overextend in an effort to further outflank the position." In other words, if you've got the power to smash through a weak enemy, don't weaken your own forces in an effort to make an envelopment simply because the book says the envelopment is the more favored form of maneuver.

I do not quarrel with that statement — that the envelopment is the more favored form of maneuver. Conditions are more likely to favor the envelopment than the penetration. But most instructors in service schools will tell you that one of the most difficult teaching jobs they have is to overcome the student tendency to employ the envelopment *habitually* without realistically weighing the relative advantages of the penetration and the envelopment in *each* situation.

The right choice of the form of maneuver to be used depends much on knowing what conditions to consider. The quarterback we mentioned previously could see that the territory around the ends was not occupied at the time he called his signals. He failed to consider whether or not they would be defended at the time his assaulting halfback, or his pass, reached those areas.

Likewise in battle we have to look ahead. We can't simply consider whether or not a flank is defended at the time of our estimate; we must consider the enemy's capability of meeting our force with a substantial defense at the critical time of our attack — at the time of assault on the enemy's positions.

Success of an envelopment depends on speed and the achievement of surprise. Loss of surprise, and a speedily reacting enemy, may turn a previously open flank into a well defended position at the time of contact. In that case an envelopment using a split force may be less successful than a penetration based on a concentration of power on a narrow front.

It is a general teaching principle that an army corps is normally the smallest unit capable of effecting a complete penetration of an enemy position. But the corps is made up of divisions, and the divisions are made up of regiments, so, broadly speaking, the regiments do participate in penetrations in that they are the spearheads of the attacking force.

Speaking of large units, it is interesting to note that many of the major operations of World War II were penetrations. To name a few: the German invasion of Poland, the British attack at El Alamein, Von Runstedt's dash through the Ardennes, and finally the greatest offensive of all time, the Normandy landings that ended in the heart of Germany.

In the Pacific where jungle operations usually limited the size of the forces the penetration was used successfully by smaller units. Japanese failure to understand the theory of the penetration, at least once, worked to our advantage. The Japanese commander on Los Negros possessed a four to one advantage over our forces. On several occasions he made gaps in our defensive position, and on one specific attack he moved over a hundred and fifty men through a hole in our lines. Instead of quickly widening the gap by attacking both flanks of the penetration, he shifted his forces to another sector in an attempt to envelop. As a result both attacks failed.

Let us examine the theory of the penetration more closely. What is a penetration? It is an operation in which the main attack passes through some portion of the enemy's main battle position and is directed against an objective in his rear. The secondary attack is directed against an area where a rupture of the line is not anticipated initially. We attack on a wide front with our greatest distribution of combat strength opposite the point of known or suspected enemy weakness.

The penetration of a defensive position can be compared to a straight line buck through center by a football team. To illustrate: Take the schematic defense shown in Figure

1. Then superimpose on this diagram the lineups of defensive and offensive football teams. (See Figure 2.)

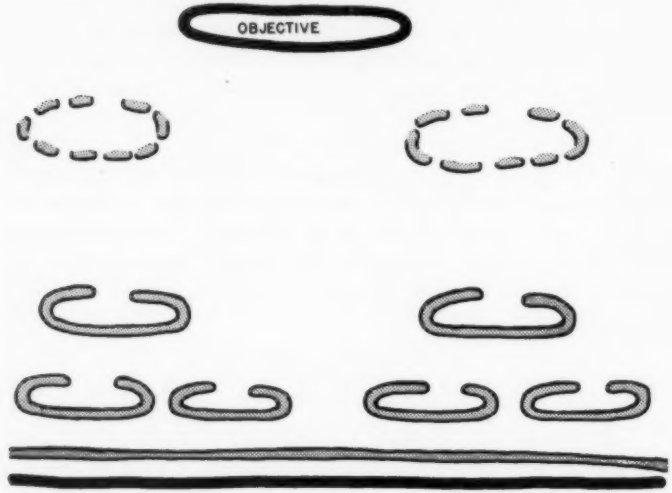

Figure 1. Normal positions of a unit in the defense. Note how the positions compare with a standard football defensive lineup such as the 6-2-2-1 defense. This is brought out more vividly in Figure 2.

The distribution of an attacking force in combat should be such as to permit three separate impulses during penetration. They are:

(1) Breaking through the hostile position initially. (See Figure 3.)

(2) Widening the gap thus created by rolling up one or both of the interior hostile flanks. (See Figure 4.)

(3) Seizing the objective. (See Figure 5.)

So far, we see that the football lineup and the combat lineup compare very closely. Now as these two setups go into action, the parallel continues. Figure 3 shows the offensive football linemen in their charge to open a hole. Our military unit performs the same action. Front line attacking troops hit the enemy position to open a gap in the enemy's forward position.

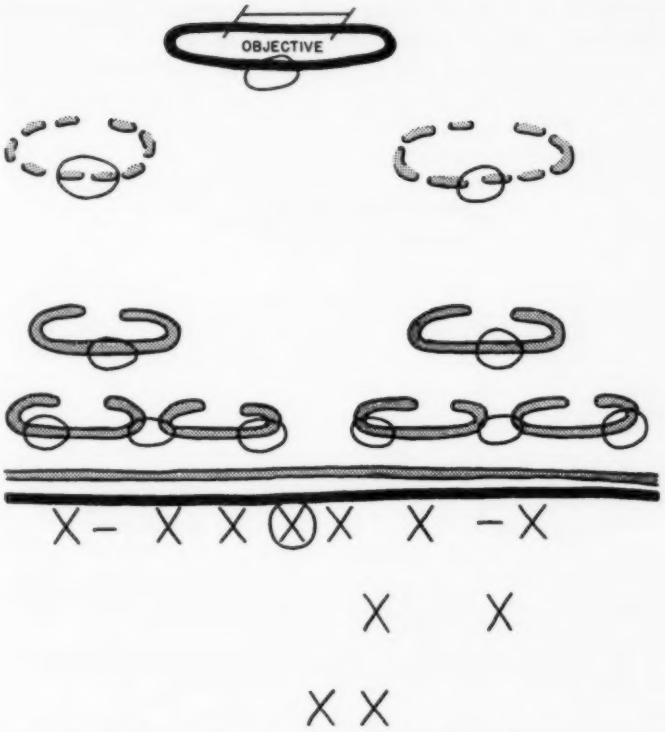

Figure 2. Here a normal defensive football lineup is superimposed on the defensive positions of a combat unit. Opposing it is an offensive team in position for a line buck. The military unit's objective has its counterpart in the football goal.

Figure 4 carries on the action of football and military combatants. In the football game more blockers get through, take care of the secondary, and widen the gap. This action has its counterpart in the military penetration.

Finally in Figure 5, the ball carrier, following blockers, goes through the line gap, through the secondary, and on to the goal line. This last action, crossing the goal, is one step farther than the military penetration itself. It may be likened to the action of an exploiting force, which, once

the objective of the penetration has been taken, proceeds to wreak havoc in the enemy's rear.

In the military action, seizure of the objective gives the higher commander an opportunity to launch his exploitation, which is a separate and distinct phase of the attack launched subsequent to the penetration.

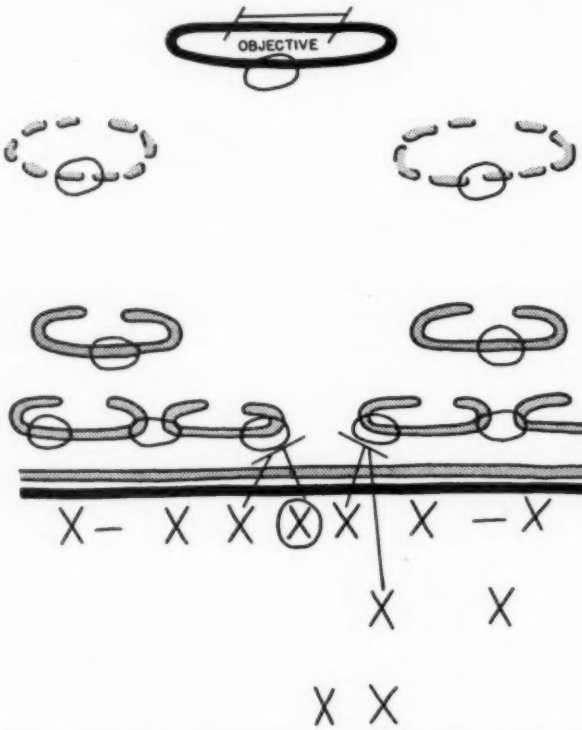

Figure 3. The initial phase of a penetration, breaking through the hostile position, corresponds to the offensive charge and blocking on the football line of scrimmage.

A successful penetration is in some ways more decisive in its effect on the enemy's will to resist than the envelopment. Once the enemy crust has been penetrated, the gap widened, and our forces move through, the enemy feels

that he is lost; that he is surrounded and faced with annihilation by the forces operating in his rear. General Eisenhower describes this feeling on page 353 of his book CRUSADE IN EUROPE in writing about the penetration in the "Battle of the Bulge."

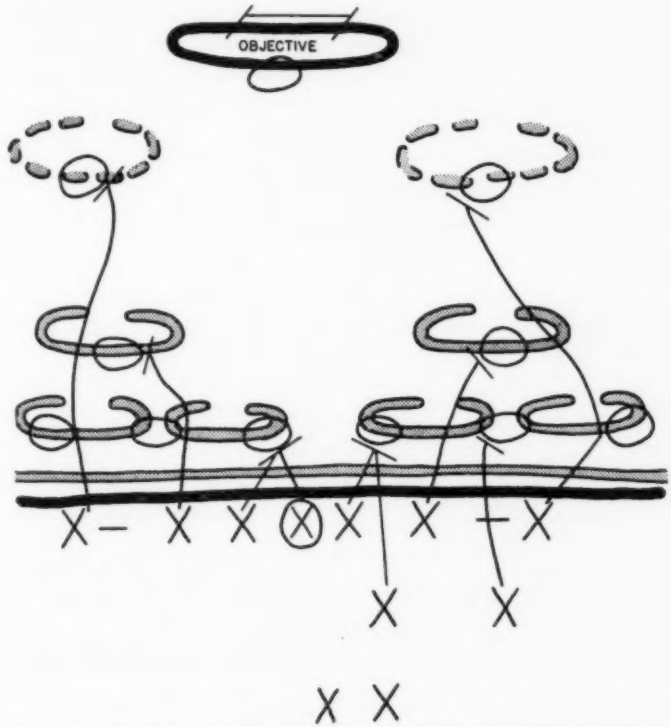

Figure 4. The second phase of the penetration, widening the gap created by the initial breakthrough, has its football counterpart. On the gridiron, additional blockers come through to knock the secondary out of the play.

"This kind of battle places maximum strain upon an Army in the field, from the highest general to the last private in the ranks. Its destructive morale effect falls most heavily, of course, upon the units that are struck by the attack. Confronted by overwhelming

power and unaware of the measures that their commanders have in mind for moving to their support, the soldiers in the front lines, suffering all the danger and risks of actual contact inevitably experience confusion, bewilderment, and discouragement."

An estimate of the situation precedes a sound decision as to the method of maneuver in our attacks. For a correct estimate the commander must understand certain factors that are associated with each type of maneuver. Here are factors pertaining to the penetration.

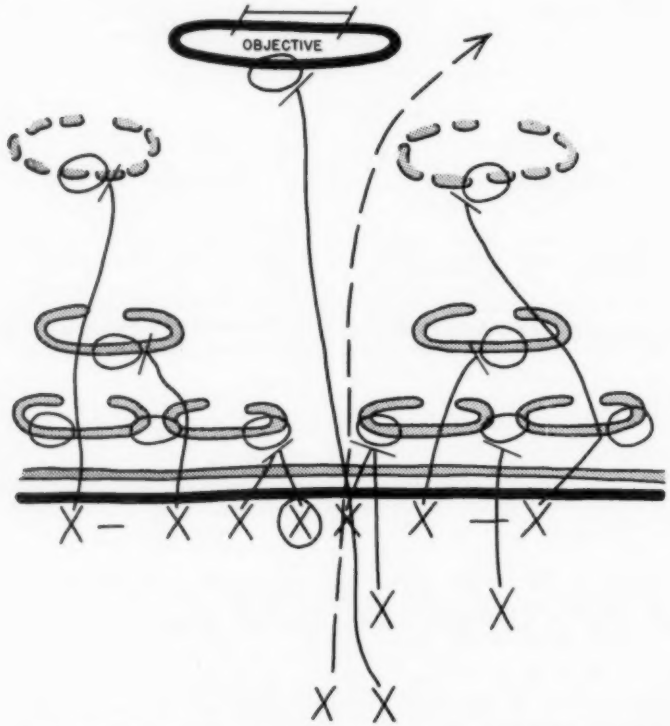

Figure 5. Seizure of the objective and operations of the exploiting force correspond with the movement of the ball carrier through the gap in the line, past the secondary, and on to the goal.

a. Conditions that *demand* a penetration:

(1) *Unassailable enemy flanks.* (When enemy flanks are anchored to an impassable obstacle; the sea, alpine mountains, a large lake, or man-made obstacles.)

(2) *Lack of time to make an envelopment.* (When the situation is such that time is of the essence and to delay permits the enemy to make his flanks unassailable, or when he has time to move to the flank a force capable of defeating an envelopment.)

(3) *The attacking force is an interior unit of a larger force.* (When higher headquarters have ordered the attack and assigned a zone so limited as to deny space for an envelopment.)

b. Conditions that *favor* a penetration.

(1) *Overextension of the enemy strength.* (The enemy forces are not sufficient to man the entire front and he holds only the key terrain features. He is unable to withstand the blows of a powerful force, smashing at his weak points.) Here again we might point out a cagy enemy could possibly meet the points of attack of our forces on an equal basis if we split our forces by attempting to envelop.

(2) *Terrain and observation favorable to the effective cooperation and employment of the combined arms.* (When fields of fire and observation favor the attacker.)

(3) *Preponderance of strength massed against a weak and demoralized enemy.* (This is similar to reason 1. Before the enemy has a chance to build up his strength or improve his positions, hit him with everything you've got rather than lose some of the shock effect of your force by diverting part of it to a flank.)

Let us say that a commander, familiar with the above factors, decides to penetrate. He knows that the wider the gap he can create, the deeper his forces can drive, and the more difficult it will be for the enemy to close the gap. Immediately then comes the question, how wide should this front be. There are no hard and fast rules as to yardage. Frontage depends largely on the size of the force and the amount of artillery, armor, and combat aviation supporting the attack. Compared to the zone of attack for an enveloping force, the area assigned a penetrating force

is relatively narrow. It should be wide enough to permit our forces to maneuver, yet narrow enough to allow us to concentrate men and weapons and smash through the enemy position. As an example: in the St Lo breakthrough, VII Corps was the penetrating force of the First Army. It had a frontage of approximately 8,000 yards assigned as follows; the 8th Infantry division, 4,000 yards; 4th Infantry Division, 1,500 yards; and the 30th Division, 2,500 yards.

Narrowing our study to the location of our attack in the area of penetration—where shall we penetrate? How should the objectives we select further the success of the operation.

Take the first question. When selecting the area of penetration, the commander should look for:

Points of known or suspected weakness in the enemy lines.

Location of the enemy reserves.

Terrain that has a corridor leading to or toward the enemy objective, or in its absence a wooded ridge leading into the enemy positions.

A good road net that is capable of supporting the attacking force and that facilitates launching the exploitation phase that follows.

Terrain free of obstacles, offering good cover and fields of fire for the entire combined arms team.

Under ideal conditions all of the above qualities may be present, but final selection of the point of attack may depend on the ability of our own forces to achieve surprise as to time, direction, and strength of attack.

In selecting objectives the commander bears in mind that certain results must be gained from their seizure.

Capture of initial objectives should insure the complete rupture of the main line of resistance at the point of penetration. Failure to break the initial crust of enemy resistance means that the rest of the attack will fail.

Intermediate objectives should facilitate holding open the gap with minimum forces while employing the bulk of the force to seize final objectives. Once these objectives are taken they not only permit passage of the balance of

the force but serve as a base from which to continue the attack and to roll up the enemy flanks by enveloping them.

Capturing the final objective completes the rupture of the enemy battle position. This objective then serves as a base for launching the movement of the exploitation force. How deep in enemy territory should these final objectives be? As a rule of thumb, in a division attack, this depth should extend beyond the enemy division's reserves and at least as far as his light artillery positions.

What are some of the advantages and disadvantages of the penetration? Advantages include:

Interior supply lines to move troops and supplies directly to the front.

Creation of enemy flanks that can be rolled up.

The ability to concentrate the bulk of our combat strength in one direction.

On the other side of the picture we have these disadvantages:

The enemy can concentrate the bulk of his firepower against the point of penetration.

The penetration is met by the enemy on ground already planned for defense.

Enemy firepower is already coordinated to meet an attack in the direction of penetration.

A penetration that fails runs the risk of being cut off and destroyed behind enemy lines.

It's up to the commander to decide whether advantages or disadvantages weigh the heavier in a particular situation. It's up to him to call the play. Just as the canny quarterback looks over his opponents' set-up; knows from the scouting reports their weaknesses; studies the condition of the field; notes the direction of the wind; and considers the blockers, runners, and passers he has on his team—so does the combat commander estimate the situation that confronts him before deciding whether to develop or penetrate.

Granting that, all other factors being equal, the envelopment is the more favored form of maneuver, the wise commander never overlooks the possibility of striking through the line to decisive victory.

Evaluation of Weather and Terrain

By Lt Col Raymond E. Daehler, Infantry

Mark Twain made famous the remark that everyone talks about the weather but nobody does anything about it. He was only half right as far as the military is concerned. Soldiers, from top commanders to individual riflemen, talk about it all the time. But they go further than that. They try to do something about it. At least they take advantage of its favorable features and take steps to minimize its bad features.

The same goes for terrain. Sometime during his training, or early in combat, the soldier begins to look on terrain as something more than scenery or real estate. It is a combination of natural and man-made features that work both good and evil for him, something that has to be adapted to his needs or his needs adapted to it.

The commander is vitally interested in weather and terrain because they influence his decisions and scheme of maneuver. The individual soldier's interest is just as vital and much more personal. He thinks in terms of concealment and cover, fields of fire for his weapon, and if the weather will be hot or cold, wet or dry.

This article discusses the influence of weather and terrain on military operations from the viewpoint of the commander and the intelligence officer—the one who uses the information and the one who gets it for him. And, since weather and terrain are so closely allied in their effects on the military aspects of an area, the term "terrain evaluation" will imply a study of both weather and terrain.

History is replete with instances where terrain evaluation played a deciding role in military engagements. At Quebec in 1759, the French General Montcalm de Saint-Veran considered the bluffs below the plains of Abraham too steep for

the British to take. British General James Wolfe, contrary to the advice of many of his staff, considered the element of surprise worth an attempt. He found a route up the steep bluffs and his men carried the day.

Almost two hundred years later and on the anniversary date of that battle, General Douglas MacArthur went through the same thought process in deciding to strike at the North Korean lines of communication by landing an invasion force at Inchon. Knowing that many of his advisers objected to the landing because of the 31-foot tides and extensive mud flats in the harbor, General MacArthur decided that the enemy would be of the same opinion and defend Inchon lightly. He also knew that to delay the date of the landing would increase the chance of encountering bad weather. Timed to take advantage of the highest tide, the landing achieved complete surprise and tactical victory.

The collection of information on terrain, hydrography, and weather is one of the responsibilities of the intelligence officer. He evaluates and interprets this information to determine how the weather and terrain will affect our mission and that of the enemy. His analysis becomes a basic part of estimates of the situation made by the commander and his operations officer.

TERRAIN EVALUATION

Terrain evaluation is the analysis of an area of probable military operations to determine the effect of the weather and terrain on the courses of action open to opposing forces in the area. Areas are influenced by such features as ridges, valleys, streams, bodies of water, beaches, woods, open spaces, roads, air fields, docks, railways, and towns. These ground forms and features can aid or hamper the movement of military forces. The commander plans his course of action to take full advantages of favorable features. The shaded areas in Figure 1 illustrate one way of indicating elevation, which makes terrain studies easier.

To arrive at a general description of an area of operations, the topographical features are studied in connection with present and predictable weather conditions. The

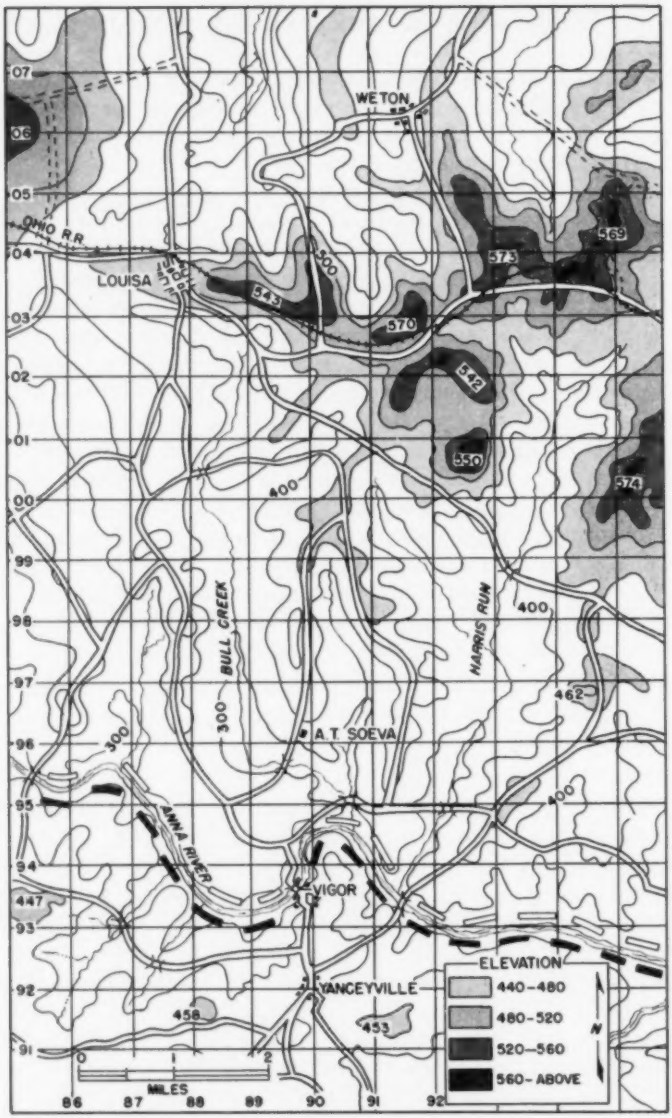

Figure 1. Map Sketch, Virginia Area. Note the shading method used to indicate increasing elevation of terrain. It is even more convenient to use colored pencils or crayons for this purpose. Lighter colors are used for the lower elevations (usually one color per 100 foot interval) shading to darker colors as the elevation increases.

weather conditions as they affect all phases of the operation are usually studied first. Then the topographical features are considered in the light of what is known about the weather.

The effect of weather is more important to a modern mechanized army than it used to be. Rain, for instance, can change soil trafficability so greatly that plans for use of trucks, tanks, and heavy artillery have to be altered. Small streams can swell to impassable barriers over night. Rain can hamper, even preclude, tactical air support. Falling snow has the same general effect in limiting visibility and causing transportation difficulty. Sudden drastic changes in temperature can influence the use of vehicles and troop morale and efficiency, especially if the change is not anticipated and protective measures taken to keep vehicles running and to keep men comfortable.

Terrain is evaluated and interpreted in terms of these five factors:

1. Critical terrain features
2. Observation and fields of fire
3. Obstacles
4. Concealment and cover
5. Avenues of approach

Each of these factors, in turn, is studied in the light of:

1. Weather conditions
2. Relief and drainage
3. Vegetation
4. Surface materials
5. Cultural (man-made) features

CRITICAL TERRAIN FEATURES

A critical terrain feature is any location the possession of which gives a marked advantage to either combatant. A bridge over an unfordable river may provide a way to the opposite shore without an assault crossing. A dominant hill or ridge may be the key to a battlefield and contribute to the success of the side that holds it. A road or rail center may be so important that loss of it will cripple the loser's ability to continue the battle. A fortified zone, when captured, may provide the entering wedge and allow exploita-

tion of rearward objectives. A beach can offer a foothold that will permit the landing of great forces. A level clearing in rough terrain may be the only possible landing field for the reinforcement of an airborne operation. A tunnel may provide the only rail or road communication between otherwise isolated areas.

The principal critical terrain features may be marked on a map or overlay, and the commander seeks ways to use these features to his own advantage.

OBSERVATION AND FIELDS OF FIRE

Observation is the characteristic of an area that permits us to see the enemy or the enemy to see us. The best observation does not necessarily coincide with the best fields of fire. It usually is found on the highest terrain feature, and observation posts are located with that fact in mind.

Fog, rain, snow, darkness, woods, brush, or tall vegetation limit or deny observation. In a defensive situation, a careful study must be made of blind spots and sectors at each observation post. Those points that provide the enemy with critical observation must be blinded by smoke or other means in order to destroy their effectiveness.

A field of fire is an area that our weapons can fire into effectively. An ideal field of fire for Infantry is an open stretch of ground where the enemy can be seen and on which he has no protection from fire within the effective range of Infantry weapons.

Fields of fire can be improved by cutting or burning weeds, grass, and crops; clearing brush and trees; demolishing buildings; and cutting lanes through woods. However, concealment must be considered in all such work. The time and labor at hand for this type of improvement should also be considered in evaluation of the terrain.

OBSTACLES

Obstacles to military movement are both natural and artificial. Natural obstacles include unfordable streams, swamps, cliffs or steep slopes, thick woods and undergrowth, flooded areas, mountains, boulder-strewn areas, and lakes. Artificial obstacles, built by man to delay or stop military

movement, include minefields, trenches, antitank ditches or barriers, roadblocks, blown bridges, and road craters.

Obstacles influence not only the choice of objectives and approaches to them, but also the time and formation for an attack. The types of obstacles dictate the methods of equipment to be used in breaching them.

Mountains can be an aid or an obstacle to the attacker. When parallel to the direction of advance, they limit cross movement and thus tend to protect the flanks. When they lie across the route of advance, they become an obstacle to the attacker and an aid to the defender.

Rivers are similar to mountains in their effect on forces moving parallel to or across them. Rivers parallel to the direction of advance can be used as routes of supply.

Marshes often cause more delay than bodies of water since causeways are usually more difficult to build than bridges. Frozen marshes, however, can be used as roads in winter.

Movement of mechanized vehicles is restricted by dense woods, marshy or soft ground, steep inclines, gullies, jungles, large rocks, bodies of water, and deep snow.

The type of soil is taken into account in evaluating obstacles. Some soils may be impassable to vehicles after heavy rains or thawing. Sandy soil may be passable when wetted down, but an obstacle when dry.

Steep slopes obstruct the movement of armored vehicles. A tank can climb a certain degree of slope under stated conditions of traction. It can climb a steeper hill when moving parallel to the contouring. Excessive slopes can cause a tank to stall or slide while climbing, or upset or throw a track while following the contouring. These factors influence a commander's plans for use of his tanks.

The type of artificial obstacles in the area determine the need for special equipment: mine exploders, flame throwers, or bridging material. The relationship of the obstacles to our position and our objective determine our formation for attack, and to some extent, the time we launch it.

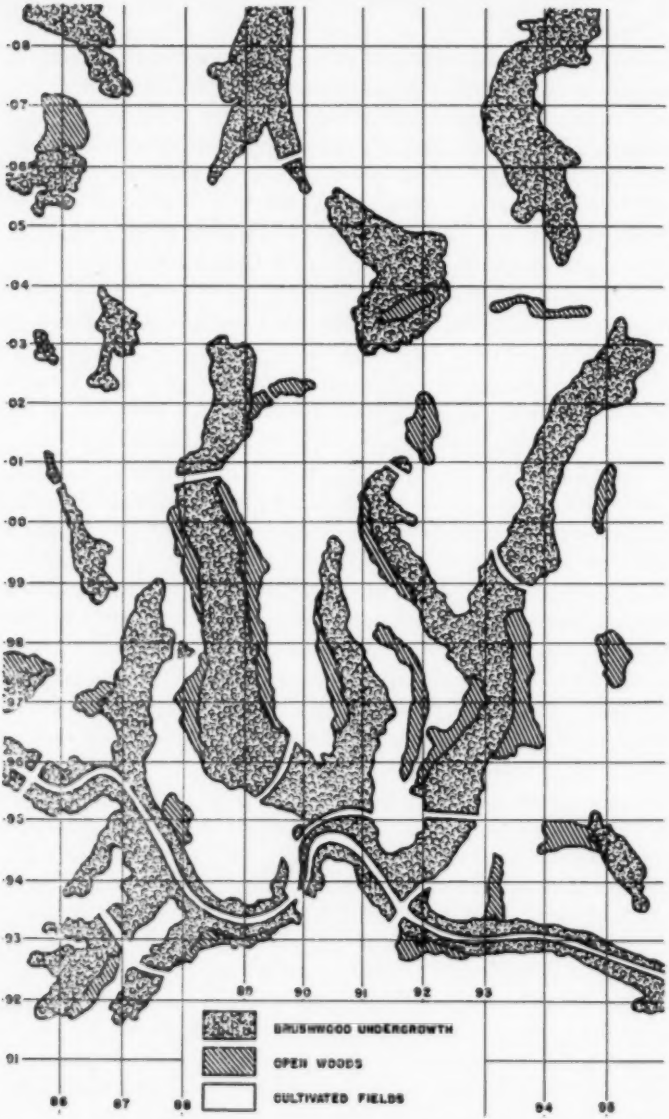

Figure 2. Vegetation Overlay for Map Sketch, Virginia Area. (Grid lines superimposed for convenience in relating this overlay to the Map Sketch.)

CONCEALMENT AND COVER

Concealment is protection from observation. Cover is protection from enemy fire. The important thing to remember about concealment and cover is that both can sometimes be determined in advance by map study and reconnaissance reports, and that all elements of a command should take full advantage of them. A study of the weather can often determine a time when movement can be made in the relative security of fog, ground haze, or moonless nights. Figure 2 illustrates a method of portraying vegetation.

AVENUES OF APPROACH

The avenues of approach to an objective are determined by an analysis of the communication network, the soil trafficability, the relationship of terrain corridors and cross compartments and enemy dispositions.

The communication network, depending upon the command level at which we are considering the area, consists of all roads, railways, and waterways over which troops or logistical support can be moved. A study of the road network includes not only the pattern of roads, but also the width of each, generally in terms of: (1) lanes of traffic; (2) the type of surfacing; (3) the location, width, and capacity of bridges; (4) the clearance of underpasses; and (5) the degree of incline on critical slopes. These can be indicated on an overlay, when necessary, and by the use of conventional symbols and different colors for the classification of roads.

A study of the rail net in an area considers the gauge, the number of tracks, the capacity of the bridges, the location and clearance of tunnels, the capacity of sidings in number of cars, and the gradient of critical slopes.

The study of roads, railroads, and waterways will indicate the best avenues of approach from the standpoint of communication.

Planning for cross-country movement of armored or other heavy vehicles calls for an analysis of soil trafficability. Trafficability is influenced chiefly by weather conditions. Since different types of soil react differently to given

weather conditions, any study of soil trafficability includes present and predicted weather conditions.

A factor that determines the suitablity of an avenue of approach is the relationship of *terrain corridors* and *cross compartments*. A terrain compartment is an area bounded on at least two sides by terrain features, such as woods, ridges, or villages that limit ground observation and observed fire into the area. These are called *limiting* features. They are usually ridges or high ground, but may be woods, cities, towns, or wide bodies of water. Delimiting lines are lines running along the limiting feature (or features) of a terrain compartment, outside of which no portion of the compartment can be seen by ground observers. A compart-

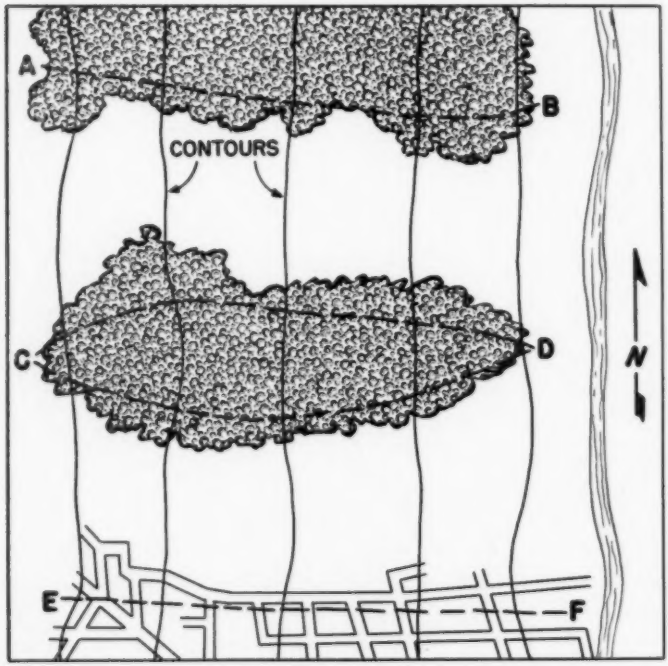

Figure 3. Terrain compartments. The upper one, ABCD, is formed by woods that bound an open area; the lower, by woods and a town bounding an open area, CDEF.

ment includes not only the area inclosed by the terrain features, but the terrain features inclosing the area as well. (See Figures 3 and 4.)

Compartments may be of any size or shape. They may be simple or complex, with the interior broken into smaller compartments. Limiting features may be high or low, continuous or discontinuous. A compartment may be screened on only two sides or on all sides.

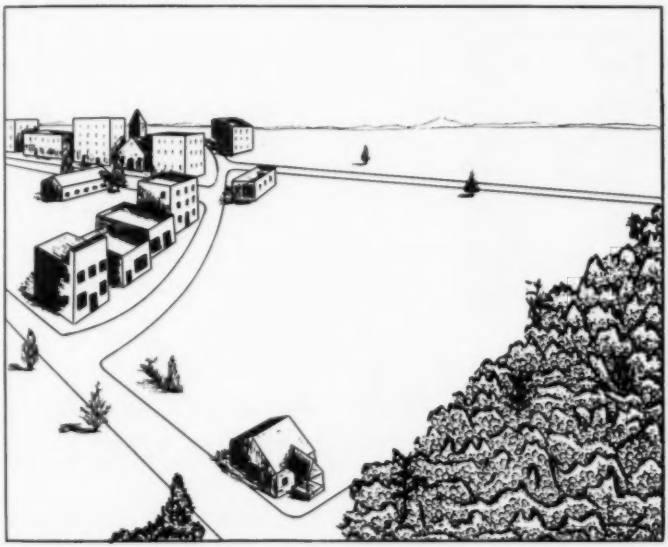

Figure 4. A terrain compartment shown panoramically. Here is another instance of a compartment formed by woods and a town bounding an open area.

Terrain compartments are classified as *corridors* when the longer dimension lies generally in the direction of movement or leads toward an objective (See Figure 5); and as cross compartments when the longer axis of the compartment is perpendicular or oblique to the direction of the movement of a force. (See Figure 6.)

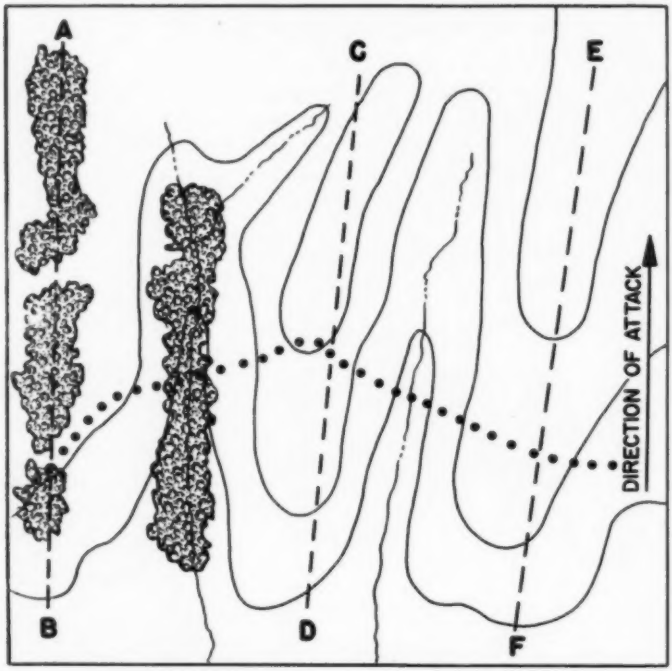

Figure 5. A terrain compartment becomes a *corridor* when its long axis lies in the direction of attack. ABCD and CDEF are corridors.

TACTICAL EFFECT OF WEATHER AND TERRAIN

Our aim in analyzing an area of operations is to discover how its weather and terrain characteristics will affect:

1. Our own mission and plan
2. The capabilities of the enemy

The two basic elements on which this analysis is based are the *critical terrain features* in the area and the *best avenues of approach to them.*

Weather and terrain factors sometimes eliminate certain of the enemy's capabilities. Lack of moonlight, for instance, may deter him from making a night attack. The wind affects his use of smoke. He is not likely to make a strong

defense if his position is in the bottom of a cross compartment, one side of which is held by our forces.

You can visualize the tactical effect of weather conditions. Rain affects soil trafficability and the conditions of rivers and streams. Rain and falling snow affect visibility, as do fog, ground haze, and extreme cloudiness. Extreme temperatures affect both personnel and equipment. Wind affects the use of smoke and chemicals.

To determine the tactical effect of weather and terrain, we first select the critical terrain features in the area. The effect of present and predictable weather conditions are then applied to these features. The second step is to select

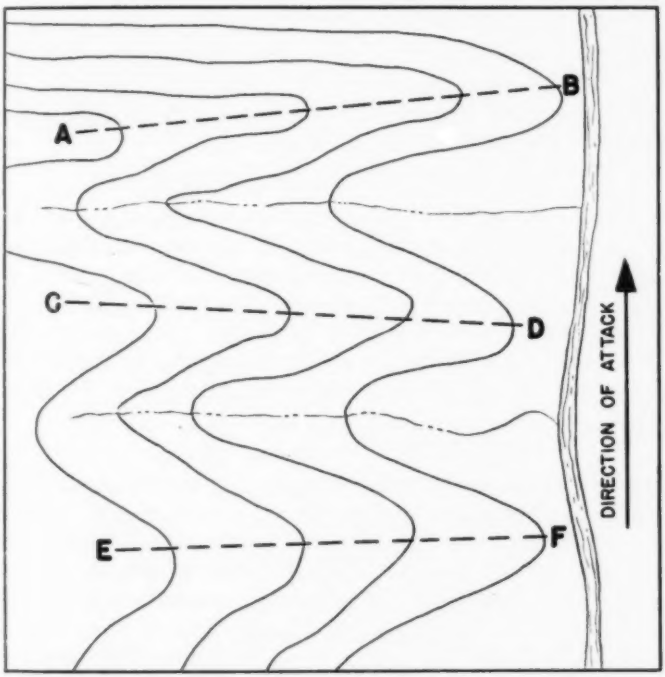

Figure 6. A cross compartment occurs when the direction of attack runs across a terrain compartment. In this illustration, compartments ABCD and CDEF, which are formed by hills on either side of valleys, are cross compartments.

the most suitable avenues of approach to the objectives and consider the effect of weather conditions on them. We consider both, from our standpoint and that of the enemy. On these studies the commander can base his estimate of the situation and formulate his plan of action.

If our mission is offensive, we accomplish it by destroying the enemy's ability to control the critical terrain features in our zone. We usually do this by seizing and holding them ourselves, using the most suitable avenue of approach presented by the conditions of soil trafficability, concealment, cover, obstacles, and observation. Many times the limiting features themselves, rather than corridors, constitute the best approach.

In a defensive situation we defend by controlling and using the critical terrain features in our sector. This is done by blocking the avenues of approach open to the enemy, by using obstacles, and by evaluating and using the available observation and fields of fire.

AIRBORNE OPERATIONS

Airborne operations are affected more strongly by the restricting effects of bad weather. Adverse weather can cause postponement or even cancellation of long and carefully planned operations. These operations require additional terrain studies to determine a route over which the link-up with other friendly forces can be made and to determine the extent of the airhead and suitable landing and drop zones.

AMPHIBIOUS OPERATIONS

Amphibious operations require additional studies of weather and terrain to determine when and where a landing can be made, type of landing craft the beach will take, soil trafficability of beaches, extent of landing area, and suitability of the areas for defensive and offensive operations.

PRACTICAL EXERCISE

1. *Situation.* *a.* Map. MAP SKETCH, Virginia Area. (See Figures 1 and 2.)

b. Blue forces are advancing to the north with the mission of attacking and destroying Aggressor forces in the zone

and on 010300 June reached the Anna River. Aggressor forces hold the area north of the river. (See Figure 1.)

c. The current short range weather forecast is as follows:

Weather forecast and light data for Louisa and vicinity 1 Jun: Heavy overcast at dawn with visibility of 2 miles; cumulus clouds at 3,000 feet becoming broken after 1300 with scattered thunderstorms after 1500. Clouds dissipating after sunset becoming clear after 2100. Wind southeast 5 to 10 miles per hour; temperature: high 83, low 67. Beginning morning nautical twilight 0355, sunrise 0435; sunset 1925, end evening nautical twilight 2000. Moon phase full, moonrise 1933. 2 Jun clear at dawn with visibility of 5 miles or more; scattered cumulus clouds at 5,000 feet, after 1200, becoming clear at 1700. Wind southwest, 2 to 5 miles per hour. Temperatures: high 90, low 75. Beginning morning nautical twilight 0355, sunrise 0435, sunset 1925, end evening nautical twilight 2000. Moon phase full, moonrise 1923. 3 Jun overcast at 3,000 feet at dawn with visibility of 3 miles; occasional breaks in overcast after 1400 with many scattered showers and thunder storms; heavy precipitation will cause decrease in trafficability in area; clearing after 2300. Wind south, 5 to 10 miles per hour. Temperature: high 85, low 68. Beginning morning natutical twilight 0355, sunrise 0435, sunset 1925, end evening nautical twilight 2000.

Moon phase full, moonrise 1913.

d. All streams and the Anna River are fordable by vehicles and troops except during and immediately after periods of heavy precipitation.

e. You are the intelligence officer of the Blue force. Following are several requirements that indicate the type of study your commander will expect you to make. (Solutions follow the list of requirements.)

2. *First requirement.* Study the entire area north of the Anna River and select and list in order of importance the most critical terrain features in the area (zone).

3. *Second requirement.* Write a brief discussion of the factor of observation and fields of fire in the zone under study.

4. *Third requirement.* From your study of the zone what obstacles, if any, are in the zone?

5. *Fourth requirement.* Write a brief discussion of the availability of concealment and cover in the zone.

6. *Fifth requirement.* What avenues of approach to your selected critical terrain features are in your zone?

A SOLUTION TO PRACTICAL EXERCISE

1. *First requirement.* Critical terrain features in the area include:

a. The highground east of Louisa including Hill 570.

b. Louisa, the only communication center beyond our present front lines. The important roads of the area all converge here.

c. Bridges across Anna River.

2. *Second requirement. a.* The best observation in the area is obtained from Hills 543, 570, 542, and 550. Hills 447, 458, and 453 in rear of our present front lines provide our best observation.

b. The ridges running north to the high ground provide observation into the lower ground on either side of each.

c. Fields of fire are generally good throughout the area. They are limited by wooded stream valleys, the small area of woods west and southwest of Louisa, and the wooded Hill 570 and vicinity.

3. *Third requirement. a.* No obstacles of any significance are in the zone. This does not mean, however, that all areas are negotiable by vehicles under all weather conditions. During periods of heavy precipitation the soil in the vicinity of the Anna River and its tributaries may become non-trafficable and the river itself unfordable.

b. Although the density of most of the wooded area will permit the passage of vehicles, some wooded area will be encountered (especially in valleys) in which the density will not permit the use of vehicles.

c. Foot troops may move anywhere in the area without difficulty.

4. *Fourth requirement. a.* Concealment is provided throughout the zone by the numerous small wooded areas. These wooded areas will provide limited concealment from

aerial observation as well as good concealment from ground observation.

b. The numerous stream beds throughout the zone offer cover to both combatants.

5. *Fifth requirement.* Avenues of approach to Hill 570 and vicinity are Bull Creek corridor; ridge extending from A. T. Soeva in grid square 8996 to Hill 570; and the corridor provided by Harris Run. Another approach to Louisa is the ridge and road which form the west limiting feature of Bull Creek corridor.

Watch for *Principles of Anti-Guerilla Warfare,* by Lt Col Arthur P. Murphy. For more than three years Col Murphy was himself a guerilla operating in the Phillippines. Now, on the other side of the fence, he presents his views on methods of combatting a guerilla enemy, in the July *Quarterly*.

The 81-MM Mortar Platoon

By Maj Charles B. Thomas, Infantry

You're a battalion commander and you want indirect fire support for that company that's having hard going on the left of your battalion zone of action. Can't get the regimental heavy mortars—they're engaged throwing everything they've got at that counterattack hitting the other attacking battalion. Can't get the direct support artillery. It's tied up on the same mission as the heavy mortars.

But there's one indirect fire unit you can call on. It's always available to you—it's your baby. That's the 81-mm mortar platoon organic to your own heavy weapons company. It's yours to use at any time without reservation.

The adoption of the target-grid method of fire control as the technique of fire for the mortar platoon enables the massed fire of the platoon to be shifted on targets throughout the battalion zone, up to the maximum range of 3300 yards.* Capable of firing 120 rounds (a half-ton of ammunition) a minute for the first minute and 72 rounds per minute thereafter, the platoon is a most effective means of influencing any action.

Made a more effective unit by the adoption of the target-grid method of fire control, the 81-mm mortar platoon has undergone some changes to better use this method. Organization has changed, and so have communication, control, and the manner of employing the platoon.

ORGANIZATION

The platoon still has a platoon headquarters and two sections of two mortar squads each. The platoon still has

*The target-grid method of fire-control is covered in two forthcoming manuals, FM 23-90, 81-MM MORTAR and FM 23-92, 4.2" MORTAR.

five one-quarter ton trucks and four one-quarter ton trailers, with one truck assigned to platoon headquarters and one truck and one one-quarter ton trailer assigned to each squad.

Detailed organization is shown in the chart in Figure 1. This chart includes changes in T/O recommended by The Infantry School.

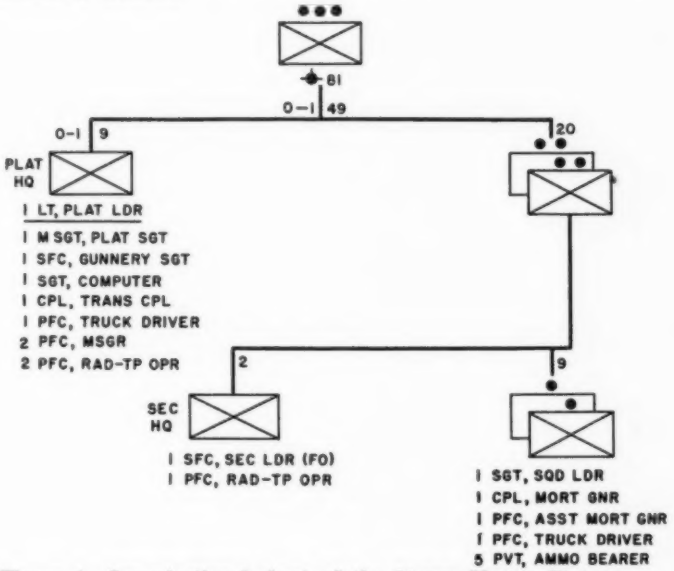

Figure 1. Organizational chart of the 81-mm Mortar Platoon.

These changes are: the instrument corporal is replaced by a gunnery sergeant and a computer. Actually, the old mortar platoon's instrument corporal becomes the gunnery sergeant and *the machine gun platoon's instrument corporal* becomes the mortar platoon's computer. The T/O revision recommended, therefore, deletes the instrument corporal from the machine gun platoon. Another point to note in the organizational chart is that each section leader is also a forward observer (FO). The reason for this and the duties of the gunnery sergeant and computer are explained later in this article.

METHODS OF EMPLOYMENT

The battalion normally employs the 81-mm mortars in general support, by platoon. When the sector of fire is too wide to cover from one firing position (more than 1500 mils), the platoon may be employed by section either from one general position area or from two section firing positions. Employment by squad is exceptional. This article is concerned mainly with the normal method of employment, by platoon.

ORGANIZATION FOR FIRING

The platoon has three elements for firing: Forward observer parties, fire-direction center (FDC), and firing unit.

Two men, a section leader, who is the forward observer, and a radio-telephone operator with an SCR-300, comprise a forward observer party. This element also carries a telephone (EE-8) and wire, which it lays from the mortar platoon switchboard as it moves forward. Each forward observer party operates in the zone of a front line rifle company. When additional forward observers are needed, the squad leaders may be used. These additional forward observers require SCR-300 radios from battalion or regiment. The primary mission of the forward observer is to move with the supported rifle company and call for and adjust fires on targets that interfere with the rifle company's mission. In addition, the FO maintains contact with the supported unit and keeps himself and the FDC informed of the tactical situation, particularly the location of the friendly front line. FO's send their fire requests and subsequent corrections direct to the fire direction center (FDC); they do not communicate with the firing position.

The FDC, which is usually the platoon CP, is the control unit that computes firing data to engage targets and sends fire commands to the firing position. It exercises the centralized control that masses and shifts the mortars' fires. The FDC is located at or near the firing position. When the FDC is not within voice range of the firing position, it uses telephone.

The platoon leader has no one place of duty. Sometimes he must reconnoiter for firing positions and routes to them and he may occupy a platoon OP or be with the heavy weapons company commander.

The FDC is operated by the gunnery sergeant, the computer, and the radio-telephone operator who operates an SCR-300 in the platoon fire control net.

The gunnery sergeant is responsible to the platoon leader for the functioning of the FDC. He approves or disapproves fire missions requested by his own forward observers or front line personnel. He determines the priorities of fire, type of ammunition and fuze to be fired, the number of mortars to fire, and the number of rounds to be fired. He maintains the map firing chart and assists the computer in determining firing data for targets reported by map coordinates. A trained computer, the gunnery sergeant alternates periods of duty with the computer to provide continuous operation of the FDC. If the platoon is firing or operating by section, he computes firing data for one section while the computer does the same job for the other section.

The computer uses the M10 plotting board to determine firing data. He plots on the board the location of the firing position and all targets fired upon. He formulates and issues the fire commands to the firing position. He also maintains the firing records.

The platoon sergeant controls the platoon firing position and supervises ammunition supply. In the platoon position the mortars are placed 30-35 yards apart. The resulting platoon front is about 100 yards wide. When possible they are placed on line (perpendicular to the initial direction of fires) so that the elevation to be placed on each mortar when engaging a target can be determined more easily.

COMMUNICATION

Wire, radio, and voice are the principal means of communication in the platoon. FO's communicate with the FDC by radio and wire. The FDC and the firing positions use voice or telephone between their locations. The platoon

switchboard, an SB-18/GT, is located there. For a schematic diagram of the radio and wire nets of the platoon see Figure 2.

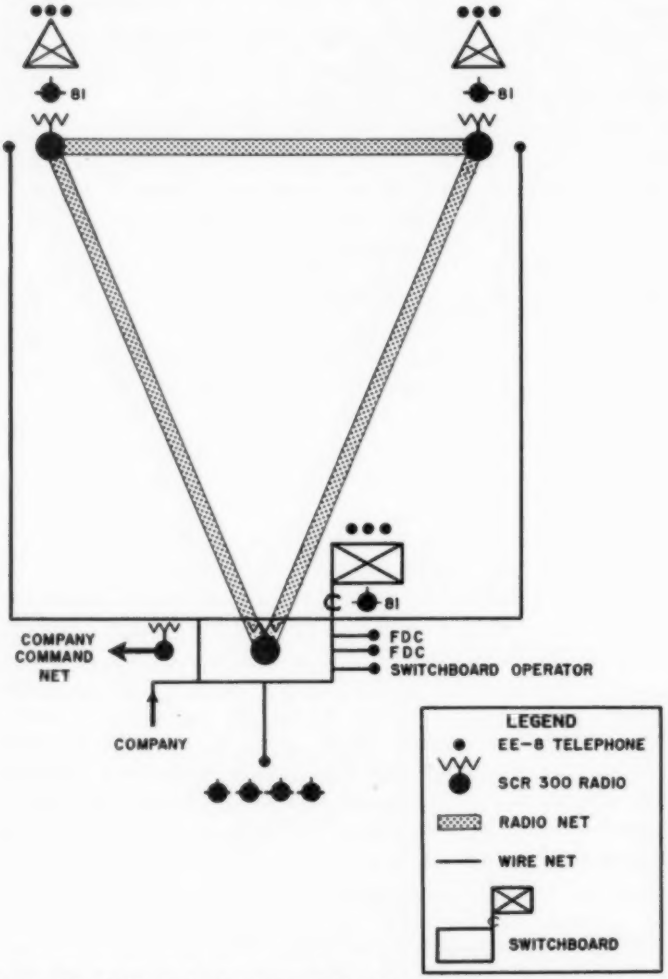

Figure 2. Radio and wire nets of the 81-mm Mortar Platoon (schematic). The line maintenance phone may also be used to communicate with an additional firing point or observation post.

PLACING THE PLATOON IN ACTION

The platoon leader, or gunnery sergeant, determines the azimuth from the platoon position area to the center of the platoon sector of fire. Usually this is determined from a map of the area. The platoon sergeant using a compass, alines the aiming stake of each mortar on the desired azimuth and the mortars are mounted. This procedure results in the mortars being laid parallel on the same azimuth.

The platoon leader or the gunnery sergeant selects a base point near the center of the sector of fire and directs the FO located closest to the mortar-base point line to adjust the platoon on the base point. If no clearly defined point is located near the center of the sector of fire, an FO is directed to select a point which he can see and then adjust the platoon on it. If the base point is not visible to both FO's, each FO adjusts the platoon on a check point, which he can see.

If the point of adjustment can be located on the map the range for the initial round may be determined from the map. If this point cannot be located on the map, then the FDC orders the round fired at a range well beyond the location of the friendly front-line and so located that the FDC believes the FO can observe it. Smoke or HE (equipped with a time fuze set to burst high in the air) will aid the FO in locating this initial round.

Once adjusted on the base point (or check point) the platoon adjusts a parallel sheaf on the base point. Sheaf adjustment is necessary because of non-uniform settling of the base plates of the different mortars. The FO nearest the mortar-base point line is selected to do the adjusting in order to keep the value of Angle T as small as possible. (Angle T is the angle formed by the intersection of the line, mortar-base point, and the line, observer-base point. (See Figure 3.)

ENGAGEMENT OF TARGETS

After the target has been located accurately, normally by adjustment, the platoon delivers fire for effect. A parallel sheaf is the most effective fire for effect. With a platoon

front of 100 yards, the width of a parallel sheaf on the ground in the target area is approximately 150 yards. Targets wider than 150 yards can be covered by opening the sheaf and traversing or by shifting the parallel sheaf over the target. However, firing on targets wider than 150 yards is not particularly desirable as it takes too long to cover the target and surprise is lost. Targets wider than 150 yards should be engaged by larger caliber indirect fire weapons—4.2-inch mortars or artillery. Targets less than 150 yards wide can be engaged by closing the sheaf of the mortar platoon. However, as this procedure is time consuming, such targets are normally engaged by firing one, two, or three mortars (depending on the width of the target) and increasing the rate of fire of the mortars used.

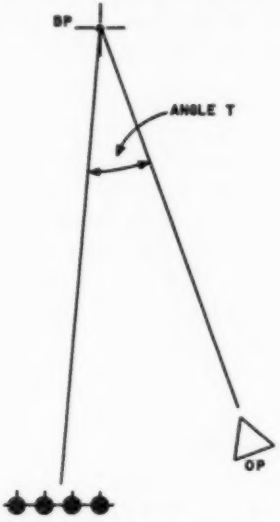

Figure 3. The Angle T, formed by the mortar-base point and forward observer-base point lines.

The platoon uses searching fire to obtain depth in fire for effect. Firing a greater number of rounds at the elevation (and charge) determined to the center of the target area will also give depth to target coverage. This results from the range dispersion inherent to the mortar.

When fire is desired on two targets simultaneously, one section may engage each target. In such cases, the gunnery sergeant computes the firing data for one section and the computer for the other.

DISPLACEMENT

The platoon displaces by section. One section with the gunnery sergeant moves to the next firing position selected by the platoon leader. The rear section under control of the platoon sergeant takes over all missions with the computer operating the FDC. When the first section arrives at the new firing position, it is laid on an azimuth determined by the platoon leader. During this period an additional SCR 300 radio is needed to establish communication with the forward observers and the remaining section. This additional radio may be obtained from battalion or the platoon leader's radio may be taken out of the company command net and used until all the platoon is in one firing position again. When the first section is laid parallel on the azimuth determined by the platoon leader, the gunnery sergeant, who is operating the forward FDC, contacts an FO and directs him to adjust the section on a base point or check point. This done, the gunnery sergeant informs the platoon sergeant that the first section is in position and can take over all fire missions. The rear section then displaces to the new position.

SPLIT SECTION FIRE

When the front is too wide to be covered by the mortar platoon from one position, the platoon can be employed by section. In this case one FO is assigned to adjust fire for each section. The gunnery sergeant moves with, establishes, and operates the FDC for one section while the computer does the same for the other section. In such cases it is necessary to obtain another SCR 300 radio from battalion for the additional FDC. Massing the fires of both sections on one target is possible if there is an overlap in the sectors of fire of the two sections.

FIRING CORRECTION FACTORS

Even though a target has been adjusted upon once, changes in the weather may necessitate different firing data for the mortars to hit the same target at a later date. Therefore, firing correction factors are determined to compensate for weather changes. These correction factors both in range and deflection are determined by firing again on the base point or on other previously adjusted concentrations. Firing corrections are kept current by re-registration after each weather change.

UNOBSERVED FIRE

Unobserved fire is fire that cannot be seen or adjusted by an observer. Fire called for at night on a target located by map or photomap coordinates probably would be unobserved. It is not as accurate as observed fire.

The accuracy of unobserved fire is increased by: (1) prior registration on a point on the ground that is identifiable on the map, and (2) determination of firing correction factors. When firing unobserved fire the platoon fires more rounds or traverses and/or searches so it will have a better chance of hitting the target.

PREARRANGED FIRES

Prearranged fires have firing data prepared in advance and are fired on call or prearranged signal. They may be observed or unobserved. Prearranged fires are most accurate when the firing data is confirmed by registration, as in the case of barrages. However, even if such fires have been confirmed by registration, a later change in the weather (direction of the wind, temperature, or precipitation) can cause inaccuracies. Firing corrections are, therefore, applied to the prearranged firing data.

ADJUSTMENT BY OTHER THAN ORGANIC PERSONNEL

Adjustment of fire on targets is not limited to the organic FO's. Every infantryman should be trained to adjust mortar fire. The greatest limiting factor in the use

of additional observers is communication to the FDC. However, this difficulty can be overcome to a considerable degree since any SCR 300 can enter the mortar platoon fire control net by changing channels. Also, any platoon, company, or battalion OP that has wire communication that can be routed through the battalion switchboard can be connected to the mortar platoon FDC.

The only prerequisite for training in mortar adjustment is the ability to read a compass and estimate distance. Training necessary in adjustment of fire is simple, since it need cover only the use of the mil relation, sensing, and the bracketing method of adjustment. All adjustment under the target-grid method is done on the observer-target line; the observer pays no attention to the location of the mortars. The M10 plotting board in the FDC is used to compensate for the observer being off the mortar-target line. (For a detailed description of observation of indirect fire see FORWARD OBSERVATION: SIMPLIFIED, by Lt. A. R. Ives, in the January 1951 QUARTERLY.)

SUMMARY

Remember, when your battalion needs indirect fire support, you, as battalion commander have your own organic indirect fire unit. To use it to best advantage, practice these principles:

1. Obtain maximum fire power by employing the 81-mm mortars by platoon.
2. Obtain maximum flexibility by using the target-grid method of fire control.
3. For the greatest accuracy, use observed mortar fire.
4. Determine firing corrections and apply them to firing data.
5. Train all personel in your infantry battalion in the adjustment of mortar fire.

Major Robert G. Kimball, a steady contributor to the *Quarterly* has written *Rifle Company in Support of an Advance Guard* for the July *Quarterly*. Watch for it.

Letters to the Editor

I have been a little late getting to your current issue of the INFANTRY SCHOOL QUARTERLY. Ever since I read a review of it and knew that you had an article on firepower I have been anxious to read it.

There is an increasing interest in the problems of the ground soldier in some quarters these days. In particular, scientists in many of our universities and industrial laboratories are becoming concerned with the need to improve the lot of the ground soldier through making available to him the benefit of technological progress of which they are aware. In order to do this intelligently, however, it is first necessary to understand the ground soldiers' problem. It is necessary to obtain scientific data and not just combat veterans' opinions. The matter of firepower is basic to any such study. Worthwhile quantitative data is greatly lacking. For this reason I was particularly glad to see Captain Antonioli's article. The real significance of it lies in the fact that at last someone is interested in a mathematical approach to what is really a very complex and little understood problem.

I have asked one of our scientists in the Weapons Systems Evaluation Group who is especially interested in the firepower of the ground soldier to read the article and let me know what he thought about it. I give you his comment exactly as he sent it to me on a buck slip.

"From all of the factors which the author mentions at the beginning he should be able to devise an appropriate firepower formula. This would be somewhat more complicated than the simple formula FR= W x R.

"It is believed that a formula as simple as this, which neglects such things as accuracy, effects of fragmentation, effects of air burst, effect on keeping enemy heads down, etc., could easily introduce a 50% error in the accuracy of the formula as far as absolute values are concerned.

"The author is obviously unaware of Lanchester's Square Law of Combat which states that the fighting strength (i.e., the effective firepower) of a unit varies as the square of the numbers of weapons of different types in the unit. This would give greatly different numbers than those obtained by the author.

"I think the author's approach has been too much simplified to be useful."

Again, I am delighted to see the Infantry take an interest in this problem to the extent you have. It is a start. A great deal can be done for the ground soldier and this is one of our first steps.

Sincerely,
JAMES M. GAVIN
Major General, USA

Thank you for your letter regarding our QUARTERLY article, FIREPOWER TODAY, by Captain V. L. Antonioli. Your expert's comments regarding the formula used by the author to determine firepower of weapons and units are most interesting.

Captain Antonioli acknowledges that he may have oversimplified his formula. However, the QUARTERLY considered the article worthy of publication as a point of departure for the problem of reckoning firepower.

We want to go further into the matter and would welcome an article on the subject from your people.

We are most appreciative of your interest. It is most encouraging to learn that the QUARTERLY has attracted attention at the level of your group.

In his article FIREPOWER TODAY, Captain Antonioli raises the question, "What do we mean by firepower?" He never satisfactorily explains exactly what firepower does mean. Will you please answer this question raised by the Captain.
Lt. Infantry

The Dictionary of United States Army Terms (SR 320-5-1) defines firepower as the "amount of fire delivered by a ship, an aircraft, a tank, a unit, or a particular weapon."

Webster's dictionary defines firepower as "the aggregate number and weight of shells and other missiles capable of being fired per minute with accuracy and effective distribution."

These definitions help to provide us with a basis upon which we may determine firepower. The formula used in the article, FP= WxR, is just one approach — one effort to determine the relative "destructive ability" power of one weapon with respect to another. As the article indicates, no formula derived so far is foolproof, because firepower in its many forms is variable with the different types of weapons and ammunition considered. See, also, the letter in this section from Maj Gen James M. Gavin of the Weapons System Evaluation Group, of the Department of Defense.

I've just finished reading FORWARD OBSERVATION: SIMPLIFIED by Capt Ives which appeared in the January QUARTERLY. The idea is fine, but I don't think the procedure is simplified enough.

Any time a formula is tossed at GI Joe he gets discouraged; thinks it's too complicated. And that goes for the WORM formula as well as any other.

Now if you really want to make forward observation simple, throw out the WORM formula and use an easy rule of thumb instead. Soldiers will savvy a rule of thumb where they won't a formula.

Here's my rule of thumb for making corrections in deviation: If the range is nearest 1000 yards, use the mil scale in the binoculars in terms of yards, that is, 10 mils equal 10 yards, 20 mils equal 20 yards, etc; if the range is nearest 2000 yards, then double the mil scale so that 10 mils equals 20 yards, 20 mils equals 40 yards, etc. In a little more detail, here is how it would look:

Ranges in Hundreds of yards	Deviation
5-14	1 mil x 1 = 1 yd
15-24	1 mil x 2 = 2 yds
25-34	1 mil x 3 = 3 yds
35-44	1 mil x 4 = 4 yds
45-54	1 mil x 5 = 5 yds

etc

GI Joe will understand this rule of thumb. All he has to remember is that if the range is nearest 1000 yards, he reads right off the mil scale; if the range is nearest 2000, he multiplies his reading in the mil scale by two — and so on. No complicated (to him) WORM formula to remember, just a simple rule of thumb.

Why don't you try it on your next "shoot" and see if it doesn't work as well as the WORM formula?

A GI Joe

It is believed that your suggestion for a rule of thumb would simplify instruction for the average rifleman. However, the trained observer should use the most accurate means at his disposal for adjusting mortar fire, and experience has shown that the WORM formula meets this qualification.

For the rifleman who will have only an occasional opportunity to adjust indirect fire in combat, a rule of thumb like yours seems an excellent expedient. Your suggestion is receiving consideration by The Infantry School with a view to teaching it as a rule to be used by personnel who will have only occasional opportunities to adjust fire.

After reading the article THE BIG BAZOOKA in the January issue a few questions came to my mind about the new weapon.

The article states that the weapon should not be fired in temperatures lower than -20° F. Has the weapon been fired successfully in Korea in temperatures that low, or lower, and if so, what reaction has it had on the weapon, and the present type rockets?

Your comments on these questions will be greatly appreciated.

Lt Wpns Platoon Leader

The present 3.5-inch rockets have been fired in temperatures below -20°F. However, it is not a recommended practice since the rate of burning of the rocket propellant decreases with a decrease in temperature.

The propellant is manufactured to give optimum performance within an initial temperature range of -20°F. to +120°F. As the initial temperature decreases below -20°, propellant burning rate decreases bringing about decreasing rocket velocities and erratic performance. Further, when firing at such low temperatures,

the rocket gunner will encounter increased backblast of powder particles which were not entirely consumed while the rocket was in the launcher. For this reason, the gunner must wear a face mask and gloves when firing at very low temperatures.

Firing in subzero temperatures has no effect on the launcher itself.

I consider the QUARTERLY a most interesting and valuable publication, and look forward to receiving each new edition.

Would it be feasible to supplement the excellent articles on doctrine and "state-side" activities with a story or two of actual combat situations fresh from the Korean theater? The comparisons between "how it should have have been done" and "how it was done" would provide material for good constructive discussion.

Capt, Inf

Evidently your letter was written prior to receipt of your January 1951 QUARTERLY. In that issue the article ACTION AT TONGMYONGWON, by Lt Col James W. Edwards, is a battalion commander's account of his organization's first action in Korea. This issue has another article, NAKTONG DEFENSE, by the same author. It is concerned with the heavy and bloody fighting in the days of the Pusan Perimeter.

The QUARTERLY plans to continue printing such articles at every opportunity.

A few days ago I saw the Training Film 7-2055, COMBAT PATROLS. Don't you think it is obsolete? I would like to see a film made on the article RAIDING PATROLS, in the January 1951 issue of the INFANTRY SCHOOL QUARTERLY.

Lt Col, Bn Commander

The Infantry School agrees with your suggestion. A new film *is* being made on patrolling, but the emphasis in it is on reconnaissance. A film on raiding patrols is a definite requirement.

Your suggestion will be considered in The Infantry School's study of 1951 training film requirements.

Congratulations to the QUARTERLY and particularly to Capt Blum for those two excellent articles THIS PLATOON ATTACKS. . . . in the October 1950 *issue, and RAIDING PATROL in the last issue. Give us more of them.*

I want to tell you that I followed your suggestion and used both articles as a "basis for a field training problem" for my platoon. It was really a simple matter to fit them to our own training area, and they gave us the detailed and down-to-earth planning that we need in small units.

In addition to the valuable assistance these articles gave me, I want to stress the point that the men themselves learned a lot and thoroughly enjoyed running problems so well planned and professionally sound. Incidentally, I've found that training, no matter how rugged, never gets dull for the men so long as they are learning something new and practical.

Anyway. I just wanted to thank you and let you know that the problems went off so well that the Battalion S3 now has the other rifle platoons in the battalion following suit.

With the increased emphasis on night fighting, my platoon and I are looking forward to Capt Blum's RIFLE PLATOON IN A NIGHT ATTACK which you announced would appear in the April QUARTERLY.

Lt George Jay
Rifle Platoon Leader

Lt Jay hasn't been disappointed. The promised article by Capt Blum appears in this issue, as announced.

The method of instruction and the lesson presented in Maj LeRoy C. Brown's article, TELL 'EM, SHOW 'EM HOW, HAVE 'EM DO IT, illustrates the usefulness of your INFANTRY SCHOOL QUARTERLY as well as its interesting reading matter.

As a platoon leader, I find this type of article very useful as I can apply it as a defensive exercise to train my platoon.

Let's have more of these same type articles in future editions.

Lt, Rifle Platoon Leader

Thank you for agreeing with the editors that Maj Brown's method of presenting a problem is of great benefit to instructors in the field. We'd like to inveigle the author into writing more such articles. However, he's so busily engaged in instruction at the Ranger Training Center, Fort Benning, it's highly unlikely we'll see any more of his ideas in article form for some time to come. We are on the lookout though for any ideas along these instructional lines. Have you an idea for an article? The QUARTERLY is always on the alert for new authors. We welcome manuscripts from all sources.

Thanks to Capt Frank F. Rathbun for his article, NEW INFANTRY TRAINING FILMS

Memory takes me back to those hours of instruction when the training schedule listed as an aid, a training film to be coordinated with the instruction. Easier said than done. Where to go? All roads led to the local film library. This was found to be lacking in both film and information. The final result was a training film that did not quite fit the subject.

NEW INFANTRY TRAINING FILMS should prove to be a guiding light for many officers inexperienced in the procurement of films. The breakdown given on the films will save valuable time in choosing the right one for each subject.

SUGGESTION: As new films are distributed, and probably will not appear in SR 110-1-1 for months, how about the QUARTERLY devoting just a page or two to these current films with synopses similar to those in this article. Might prove a big help to many instructors.

Lt, Inf

An excellent suggestion and one which the QUARTERLY plans to adopt. Look for those reviews from time to time as new films are released.

Congratulations on your excellent article about the new 2½ ton truck by Captain Robert M. Cook, Infantry. We should like your permission to reproduce this article for use by cadets of the First Class, USMA, who take the Automotive course conducted by this department.

Yours very truly,
S. W. CONNELLY
Lt Col, Ord Corps
Associate Professor
United States Military Academy

This permission is granted. The Infantry School is most willing to grant such requests to military units provided that all copies carry a credit line to the effect that reproduction is with permission of the INFANTRY SCHOOL QUARTERLY.

In your January 1950 issue you had a little added attraction which I found useful and which you have not used since. I am referring to the extra illustrations that you included in the back of the magazine, to be used as cut-outs for projection with a balopticon projector or some similar means.

Personally, I'd like to see you do more of this. Each issue has had useful illustrations, but to use them on slides means cutting up my copy of the magazine.

Best regards,
Captain, Infantry

Those duplicate illustrations were a trial feature of the QUARTERLY. We've been in the dark as to whether they met with our reader's approval. Yours is one of several favorable comments we've received recently on the idea. Since our subscribers' desires influence QUARTERLY policy, you may expect to see such illustrations again.

Congratulations on your January issue of the QUARTERLY. Some of the articles were very helpful. When I say helpful, I am speaking from the standpoint of a company officer in a division that is just getting rounded into shape.

At the present time our training ranges all the way from School of the Soldier to field exercises. We are putting small groups of new men through basic training at the same time that we are conducting unit training on squad, company, and battalion level. We are due to leave on maneuvers in a few months.

The kind of articles we like here are the ones we can make use of — the small unit stuff — and articles dealing with new weapons. "The Big Bazooka," "Show 'Em How," and "Raiding Patrol" in your last issue had the kind of material in them that I'm talking about.

Keep your stuff on our level and you'll keep at least one subscriber.

1st Lt, Infantry

We'll hold you to that promise, Lieutenant. We think you'll find several articles in this issue that are right in your line.

Have just read CAPTAIN DOUGHBOY — INFANTRY TANK TEAM COMMANDER, by Lt Col George B. Pickett, Jr., Armor, in the January issue. At

last we have an article that admits the Infantry-Tank Team is the same as the Tank-Infantry Team. Congratulations, Col Pickett, for enunciating the close coordination that is essential for victory on the battlefield.

Would you kindly publish the answers to the following questions:

Are the officers and men of the Infantry Regfiimental Tank Company Infantry or Armor?

Who trains the personnel of the Infantry Tank Company?

In the event that a platoon or the whole Tank Company is knocked out, how will they be replaced?

Sincerely yours,

A Doughboy

Your interest in the close coordination required to insure the success of the Infantry-Tank Team is heartening. Your questions are timely and should be of interest to all infantry officers.

Specifically the answers to your questions are:

First: The basic branch of the officer of the Regimental Tank Company may be Armor or Infantry. Once assigned to the Infantry regiment, all personnel wear Infantry insignia regardless of basic branch. Enlisted men have no branch assignment as such, but are assigned in their regiment according to their MOS and the needs of the regiment.

Second: The responsibility for training the personnel of the tank company rests with the Infantry regimental commanders. Obviously this is also a responsibility of the tank company commander, who supervises and conducts the training of all elements of his command. Replacements normally will be trained by an Armor training agency.

Third: Replacements of personnel and vehicles for losses during combat will be made the same way as for any other type unit. Vehicular replacements will be processed through supply channels while personnel replacements are processed through personnel channels. Tank Company personnel replacements will normally be Armor trained and will be requested by appropriate MOS.

As a matter of practical necessity at the present time, Infantry officers and Infantry-trained enlisted men are being assigned to regimental tank companies. For this reason, The Infantry School has included familiarization with tank weapons in both officer and NCO courses as well as thorough tactical training in the employment of Infantry-Tank Team.

Capt Charles K. Blum, who has been writing for the *Quarterly* for more than a year, has another article coming up in the July issue. Watch for his *Rifle Platoon in the Attack of a Fortified Position.*

Quarterly Writers

Captain Charles K. Blum is one of the QUARTERLY'S most prolific and — according to letters from our readers — most popular contributors. His two previous articles, THIS PLATOON ATTACKS and RAIDING PATROL, brought forth considerable reader comment. Captain Blum uses the same informal, narrative style to relate another small unit situation in PLATOON IN A NIGHT ATTACK. A veteran combat Infantryman of the 3d Division, Captain Blum is now with the Tactical Department of The Infantry School.

* * *

The striking analogy between a pile-driving football play and a military penetration in PENETRATION AS A FORM OF MANEUVER is no chance figure of speech. The author, Lieutenant Colonel James H. Reynolds, was head football coach at Valley Forge Military Academy, Wayne, Pa., before entering the Army. He served as company commander and Regimental S2 in the 6th Infantry Division during World War II. He is now an instructor in tactics at The Infantry School.

NAKTONG DEFENSE is the second article sent to us by Lt Col James W. Edwards, who, when last heard from, was still commanding a battalion of the 23d Infantry, 2d Division. Colonel Edward's original manuscript was much too long for us to use in the QUARTERLY but much too valuable to waste. So we trimmed it down to our size and are presenting it in the hope that we haven't weakened it too much in the process. Colonel Edwards, incidentally, writes that he is planning to squeeze in seven other articles on the Korean fray if he can get time between battles.

* * *

The conflict of doctrine with practical application in a line organization is the basis of COMMUNICATION ON EXTENDED FRONTAGES by Captain R. E. Womer, a former instructor in the Communication Department of The Infantry School. Captain Womer, now the regimental communication officer of the 26th Infantry, 1st Division, contends our training should emphasize the abnormal and the exceptional more strongly. He also takes issue with other points taught at The Infantry School.

Major Charles B. Thomas, author of 81-mm MORTAR PLATOON, was an instructor in the Weapons Department of The Infantry School from August 1947 until late 1950. In addition to his instructional duties, he authored or co-authored mortar field manuals and a training film on the regimental Heavy Mortar Company. An honor ROTC graduate from Johns Hopkins University, Major Thomas campaigned with the 42d Division in Europe during the war and with the 24th Constabulary in the Army of Occupation.

* * *

Major Edward M. Flanagan proves again in his second article in consecutive issues of the QUARTERLY that The Infantry School has no monopoly on airborne thought, development, and conjecture. An instructor in airborne techniques at The Artillery School, Major Flanagan contributed DEATH OF THE GLIDER to our January issue and follows up this time with a soundly reasoned guess about what the BEACHHEAD OF THE FUTURE might be like if our nation's full production potentialities are realized and the enemy is hit by the ultimate in strategic air spearheads.

* * *

Lieutenant Colonel Raymond E. Daehler, author of EVALUATION OF WEATHER AND TERRAIN left the Staff Department of The Infantry School in January to attend the Armed Forces Staff College. He had been an instructor in intelligence since July 1949. He island-hopped with the battle-wise American Division from June 1942 until September 1945 and attended the Command and General Staff College after the war.

* * *

Major Robert G. Kimball combined combat knowledge gained in two theaters with academic study and instruction to create his article, CROSS BEFORE YOU GET THERE. He served 19 months in the Southwest Pacific with the 27th and 37th Divisions as a machine gun sergeant. Returning to the US to attend OCS, he crossed to the European side in May 1944 as a second lieutenant to lead platoons in the 20th and 102d Divisions. He came to Fort Benning in the Advanced Class of 1948-49 and remained as an instructor in company offensive tactics after graduation.

* * *

Colonel Strode Newman, author of REGIMENTAL OFFICERS' SCHOOL, is not the kind of man who dreams up an idea and then forgets about it. He began planning his regimental officers' school as far back as 1936 while he was a company commander in the 26th Infantry at Plattsburg Barracks. Then, after tasting both staff and command duty with the 24th Division in the Pacific, he had another inspiration. This one blossomed into the Aggressor Army we now use in training. At that time the colonel was chief of the Training Division, G2 Section, Army Ground Forces. He qualified as a paratrooper in 1949 and, after a year as chief of staff, 11th Airborne Division,

took command of the 511th Airborne Infantry.

* * *

Major Knut H. Raudstein, who passes out some useful tips on preparing your regiment for MOVEMENT BY AIR, came to the Army via the CMTC, NG, ROTC route. His continuing travels with the Army have included such celebrated resorts as the beach at Normandy and a little Belgian village called Bastogne, both of which he toured with the 101st Airborne Division. He lingered in Europe with the Occupation, returning in 1948 to attend the Advanced Class at The Infantry School. After graduation in 1949, he remained as an instructor with the Airborne Department.

As an instructor with the Recoilless Weapons Committee of The Infantry School's Weapons Department, Major Lee W. Fritter writes with authority on THE 105-mm RECOILLESS RIFLE. During the European campaigns, he served with the 101st Airborne Division and later as a liaison officer to the Air Force. In 1945, Major Fritter joined the 8th Infantry Division and was with them upon their return to the States and de-activation. Following this, he was assigned to the Army Ground Force Headquarters at Fort Monroe, Va., until he came to Fort Benning as a member of the Advanced Class in 1948. Major Fritter had the unique experience of witnessing the atom bomb test at Bikini in 1946.

Something new in *Quarterly* articles is planned for the July issue. Captain Frank F. Rathbun is preparing a *pictorial* article on *Night Patrols*. The article will consist almost entirely of photographs and drawings supplemented by a minimum of text.

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